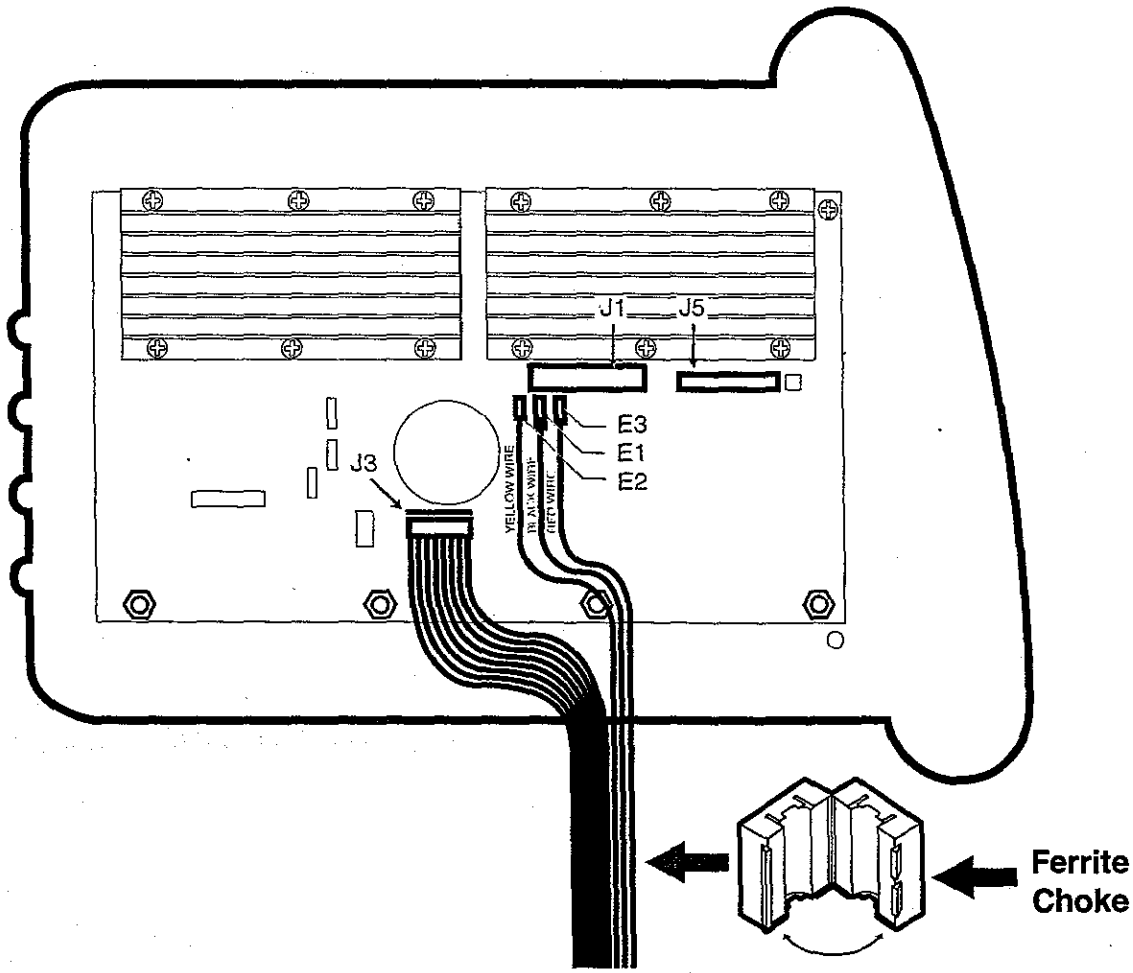


Figure 5-25. Power Supply PCBA

12 Remove connectors J5 and J1 from the power supply as indicated in Figure 5-25.

13 Un-snap the hinge on the Ferrite Choke provided with the docking bay and place it around the cables coming from the docking bay . Re-snap the hinge insuring that it is securely locked in place.

14 Replace the white cover onto the 8 position connector that was removed in step 6.

15 Move the right cover away from the ventilator and connect the cables coming from the docking bay to the power supply as indicated in Figure 5-25 and in accordance with the following:

- The 8 position connector attaches to J3 with the locking tab in the upper position.
- The black wire connects to terminal E1.
- The yellow wire connects to terminal E2.
- The red wire connects to terminal E3.

16 Connect the two harnesses to J1 and J5 that were previously removed.

CAUTION

Before assembling the ventilator, be sure to double check the alignment of connector J5. Misalignment of this connector can cause catastrophic damage to the Power Supply and/or the Main PCB.

17 Install the right side cover to the ventilator .

18 Install the external batter y pack into the docking bay .

19. Plug the ventilator into AC power and verify that the charge indicators for both the internal batter y adn the external batter y are illuminated (green or yellow).

20 Attach a patient circuit to the ventilator and turn it on.

21 Per form the checkout procedure as described in the TBird Operator's Manual.

22 Place the ventilator into Standby and allow the internal and external batteries to charge for approximately 11 hours.

23 Verify that both charge indicators are illuminated green after the 11 hour charge period.

Wire Harness and Cable Assemblies

Note

Prior to removing a harness from the ventilator, it is advisable to label it first. Also note the connection points and the orientation of the locks or alignment key for proper installation. Refer to Table 5-1, below for further reference. Also, refer to the wiring diagram in the schematic section.

1 Remove the top and side covers from the ventilator .

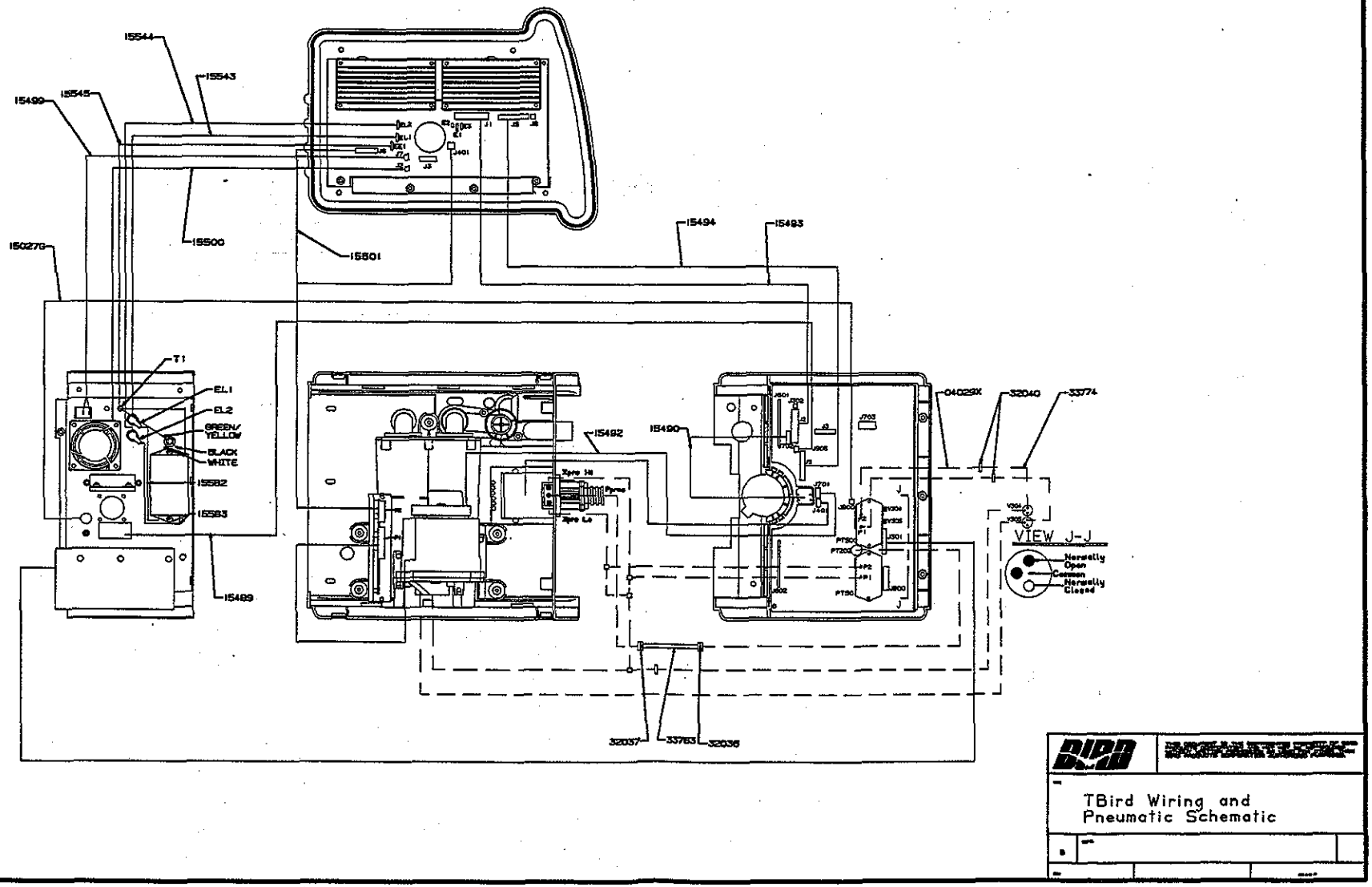
2 Locate the harness to be removed and identify as required.

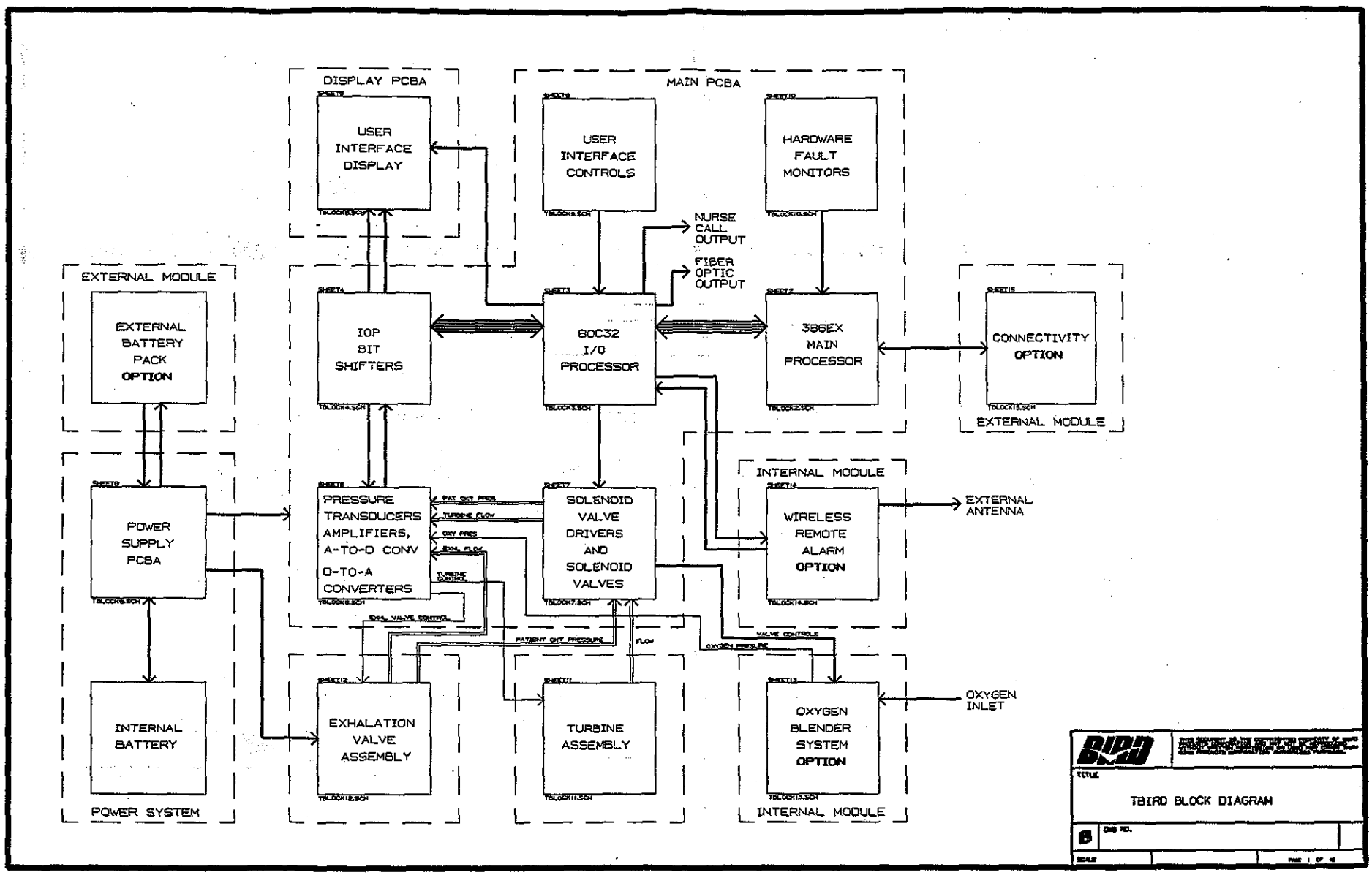
3 Unplug the ends or the cable or unplug one end of the cable and remove the attached hardware as required.

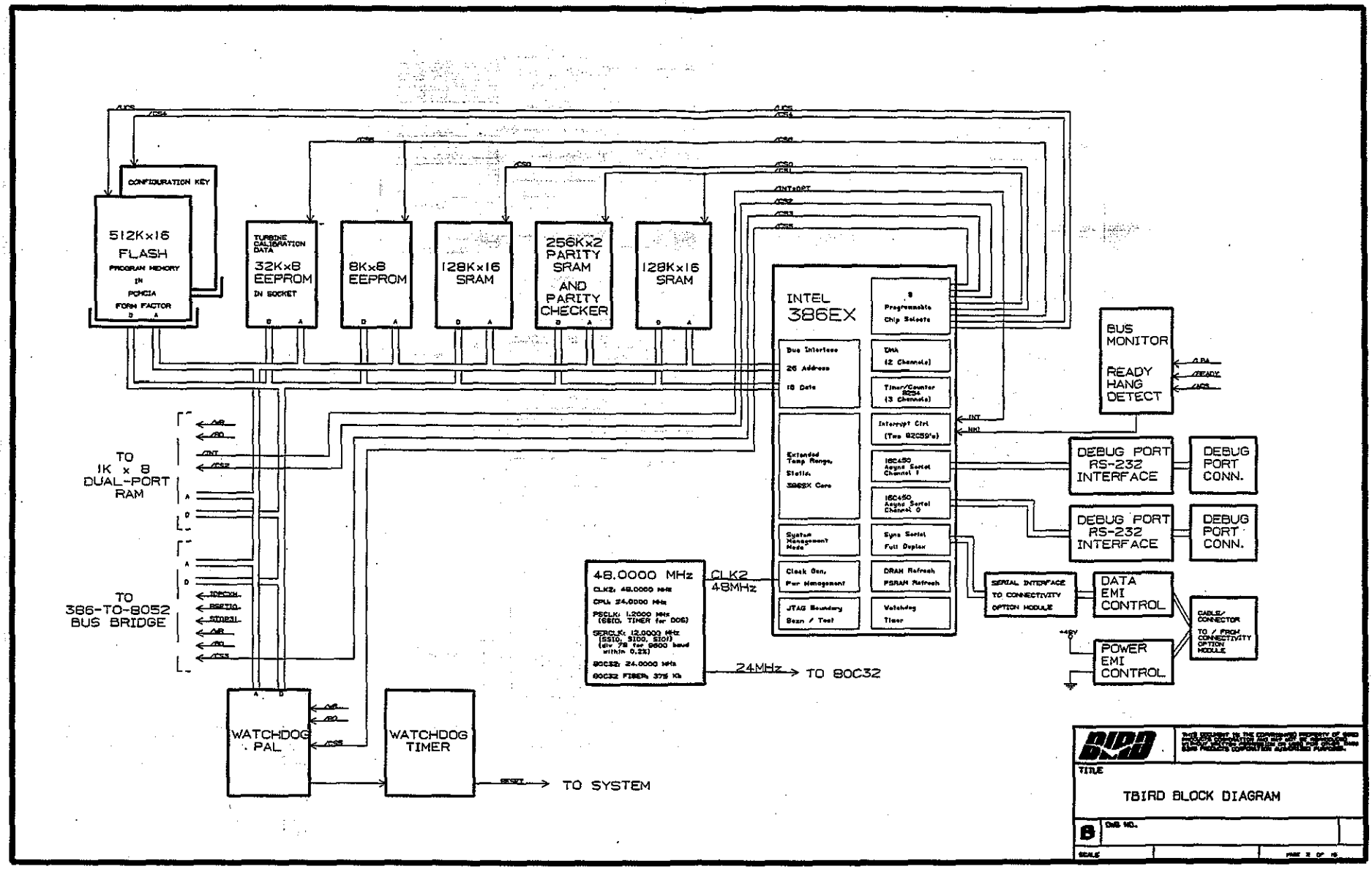
4 Refer to the following table for installation.

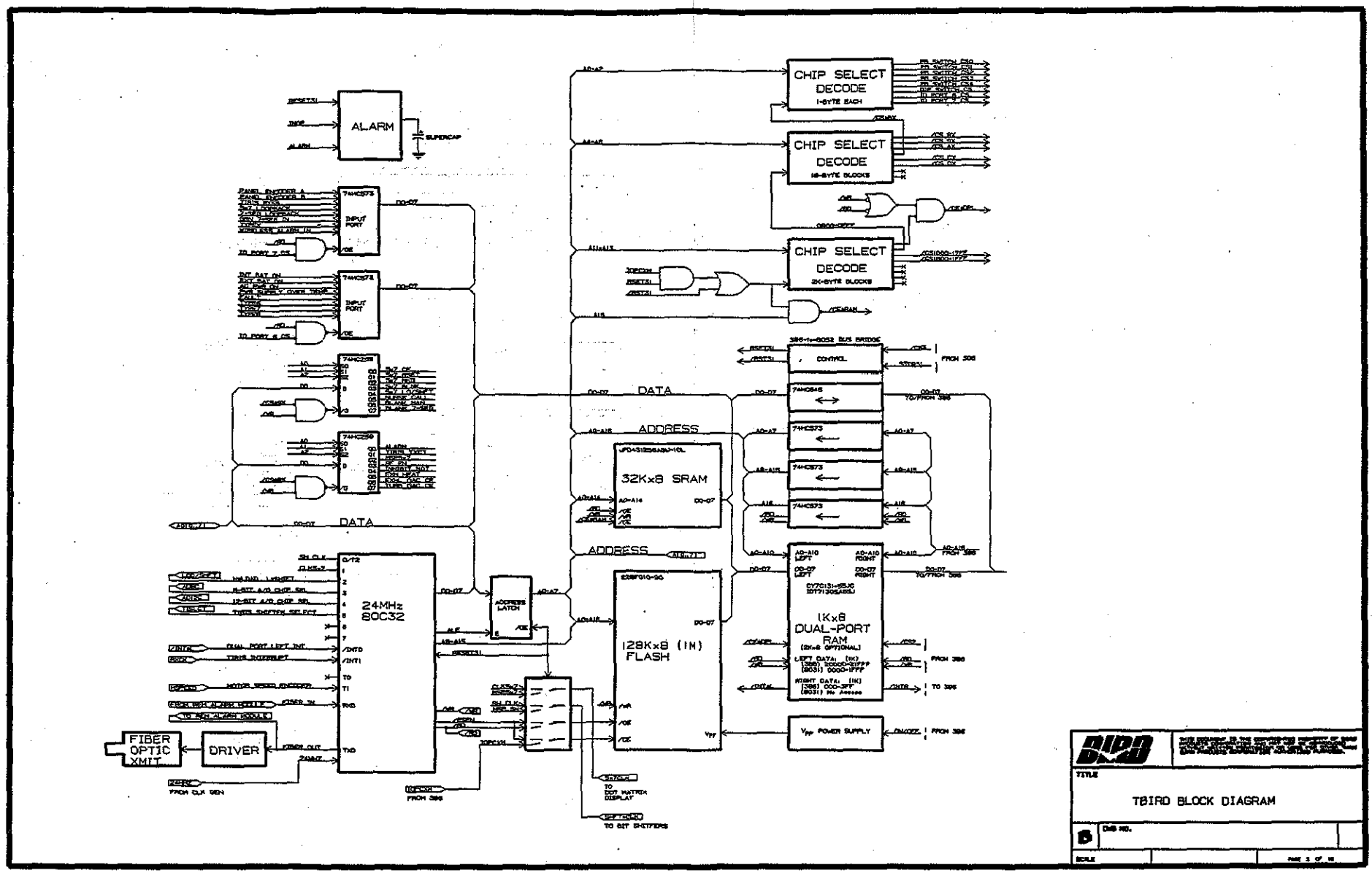
Table 5-1 - Wiring Connections

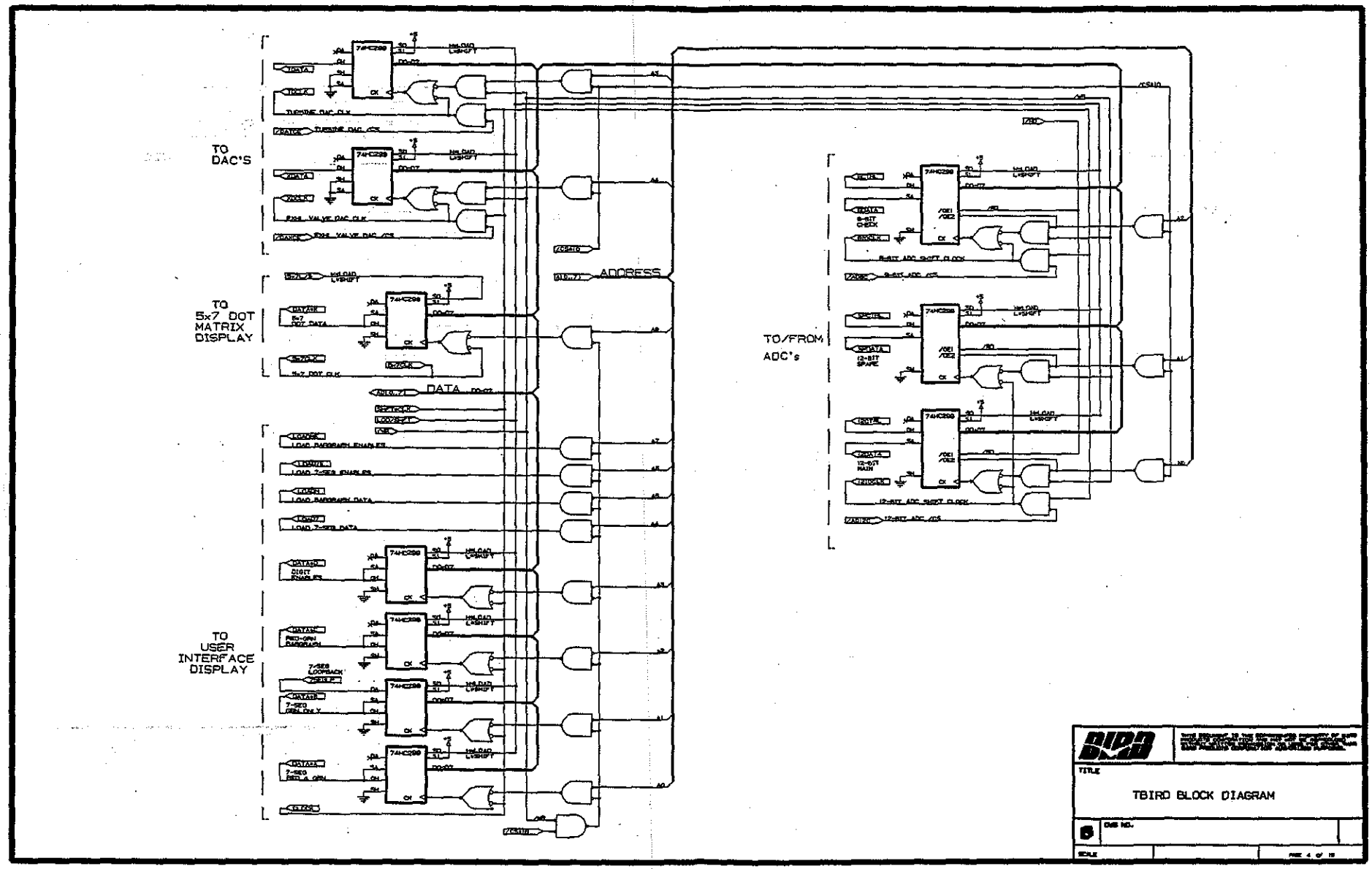
Part #	From	To
15[illegible]G	Rear Panel Alarm Loudness Control	Main PCBA J900
15[illegible]	Rear Panel Patient Assist Call Connector	Main PCBA J905
15[illegible]	Front Panel Encoder	Main PCBA J702
15[illegible]	Turbine Speed Encoder	Main PCBA J701
15[illegible]	Power Supply J1	Main PCBA J2
15[illegible]	Power Supply J5	Main PCBA J5
15[illegible]	Blender (**TBird™ AVS** and **VSO_2** Only)	Main PCBA J301
15[illegible]	Rear Panel Stand By/On Switch	Power Supply J7
15[illegible]	Rear Panel Fan	Power Supply J2
15[illegible]	Top Cover Harness	Power Supply J6 and Motor Controller PCBA P2
15[illegible]	Batteries and Energy Storage Capacitor	Harness 15501
15[illegible]	Line Fuse EL1 (Side Lug)	Power Supply EL1
15[illegible]	Neutral Fuse EL2 (Side Lug)	Power Supply EL2
15[illegible]	Rear Panel Ground Stud	Power Supply EE1
N/A	Turbine	Motor Controller PCBA P1
15[illegible]	EMI/RFI Filter (Case)	Rear Panel Ground Stud
15[illegible]	EMI/RFI Filter (Load)	Neutral Fuse EL2 (End Lug)
15[illegible]	EMI/RFI Filter (Load)	Line Fuse EL1 (End Lug)

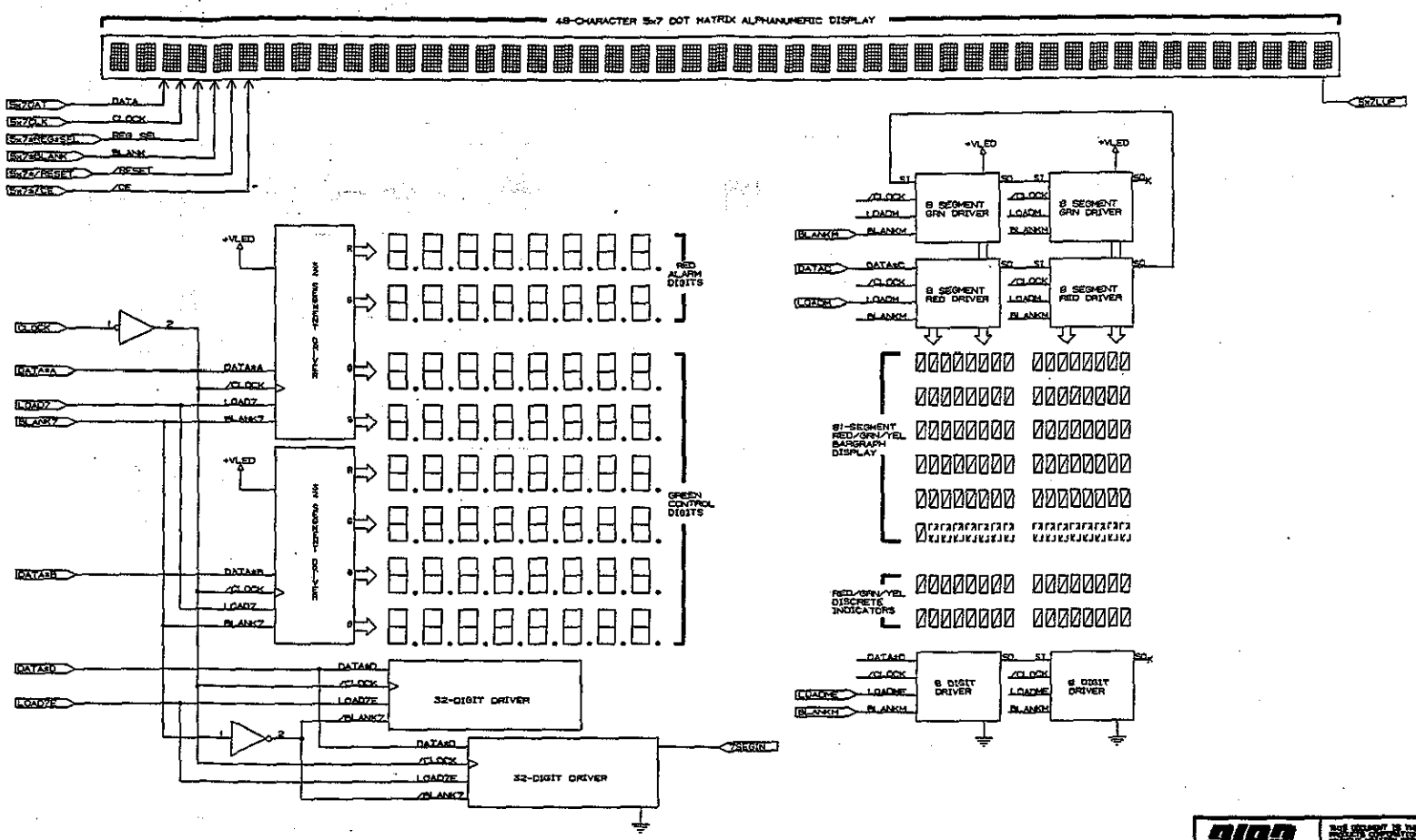

15544
15543
15499
15545
15500
15501
150270
15494
15493
T1
EL1
EL2
GREEN/
YELLOW
BLACK
WHITE
15582
15583
15489
15492
15490
040250
32040
33774
VIEW J-J
Normally
Open
Common
Normally
Closed
32037
33783
32036
TBird Wiring and
Pneumatic Schematic


DISPLAY PCBA
MAIN PCBA
USER INTERFACE DISPLAY
USER INTERFACE CONTROLS
HARDWARE FAULT MONITORS
NURSE CALL OUTPUT
FIBER OPTIC OUTPUT
EXTERNAL MODULE
EXTERNAL BATTERY PACK OPTION
IOP BIT SHIFTERS
80C32 I/O PROCESSOR
386EX MAIN PROCESSOR
CONNECTIVITY OPTION
EXTERNAL MODULE
INTERNAL MODULE
POWER SUPPLY PCBA
PRESSURE TRANSDUCERS AMPLIFIERS, A-TO-D CONV D-TO-A CONVERTERS
SOLENOID VALVE DRIVERS AND SOLENOID VALVES
WIRELESS REMOTE ALARM OPTION
EXTERNAL ANTENNA
INTERNAL BATTERY
EXHALATION VALVE ASSEMBLY
TURBINE ASSEMBLY
OXYGEN BLENDER SYSTEM OPTION
OXYGEN INLET
POWER SYSTEM
INTERNAL MODULE
TBIRD BLOCK DIAGRAM

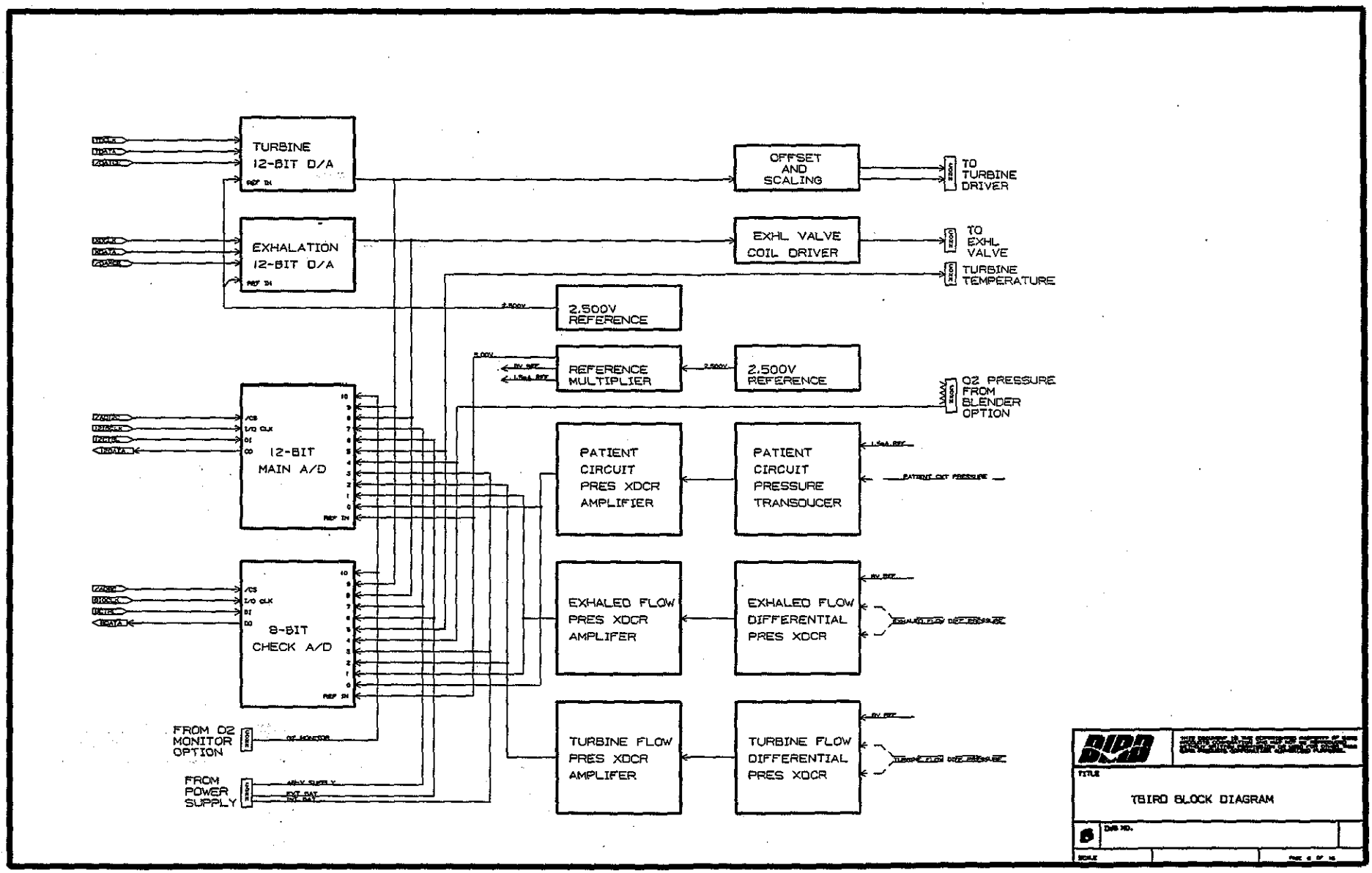

CONFIGURATION KEY
512Kx16 FLASH PROGRAM MEMORY IN PCMCIA FORM FACTOR
TURBINE CALIBRATION DATA
32Kx8 EEPROM IN SOCKET
8Kx8 EEPROM
128Kx16 SRAM
256Kx2 PARITY SRAM AND PARITY CHECKER
128Kx16 SRAM
INTEL 386EX
Bus Interface
26 Address
16 Data
Extended Temp Range, Stella, 386SX Core
System Management Mode
Clock Gen, Pwr Management
JTAG Boundary Scan / Test
8 Programmable Chip Selects
DMA (2 Channels)
Timer/Counter 82C54 (3 Channels)
Interrupt Ctrl (Two 82C59's)
16C450 Async Serial Channel 1
16C450 Async Serial Channel 0
Sync Serial Full Duplex
DRAM Refresh PSRAM Refresh
Watchdog Timer
BUS MONITOR
READY HANG DETECT
DEBUG PORT RS-232 INTERFACE
DEBUG PORT CONN.
DEBUG PORT RS-232 INTERFACE
DEBUG PORT CONN.
SERIAL INTERFACE TO CONNECTIVITY OPTION MODULE
DATA EMI CONTROL
CABLE/ CONNECTOR TO / FROM CONNECTIVITY OPTION MODULE
POWER EMI CONTROL
+5V
TO 1K x 8 DUAL-PORT RAM
TO 386-TO-8052 BUS BRIDGE
48.0000 MHz
CLK2, 48.0000 MHz
CPU: 24.0000 MHz
PSCLK: 1.2000 MHz (SSIO, TIMER for DOS)
SERCLK: 12.0000 MHz (SSIO, 9100, 8101) (div 78 for 9600 baud within 0.2%)
80C32: 24.0000 MHz
80C32 FIBER: 375 Kb
CLK2 48MHz
24MHz → TO 80C32
WATCHDOG PAL
WATCHDOG TIMER
→ TO SYSTEM
TITLE
TBIRD BLOCK DIAGRAM
SIZE
B
DWG NO.
SCALE

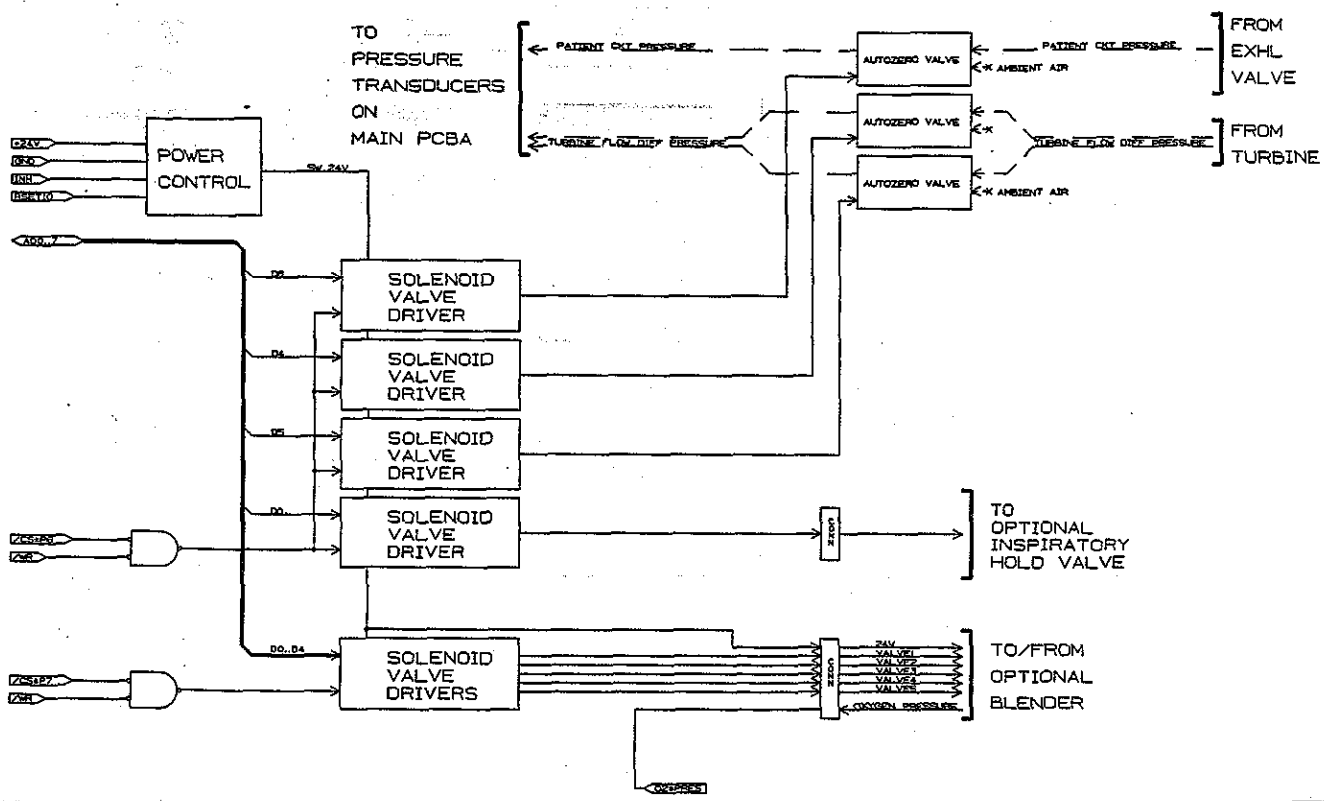

ALARM
SUPERCAP
CHIP SELECT DECODE
1-BYTE EACH
CHIP SELECT DECODE
16-BYTE BLOCKS
CHIP SELECT DECODE
2K-BYTE BLOCKS
INPUT PORT
INPUT PORT
DATA
ADDRESS
32Kx8 SRAM
128Kx8 (IN) FLASH
ADDRESS LATCH
24MHz 80C32
1Kx8 DUAL-PORT RAM
FIBER OPTIC XMIT
DRIVER
TBIRD BLOCK DIAGRAM

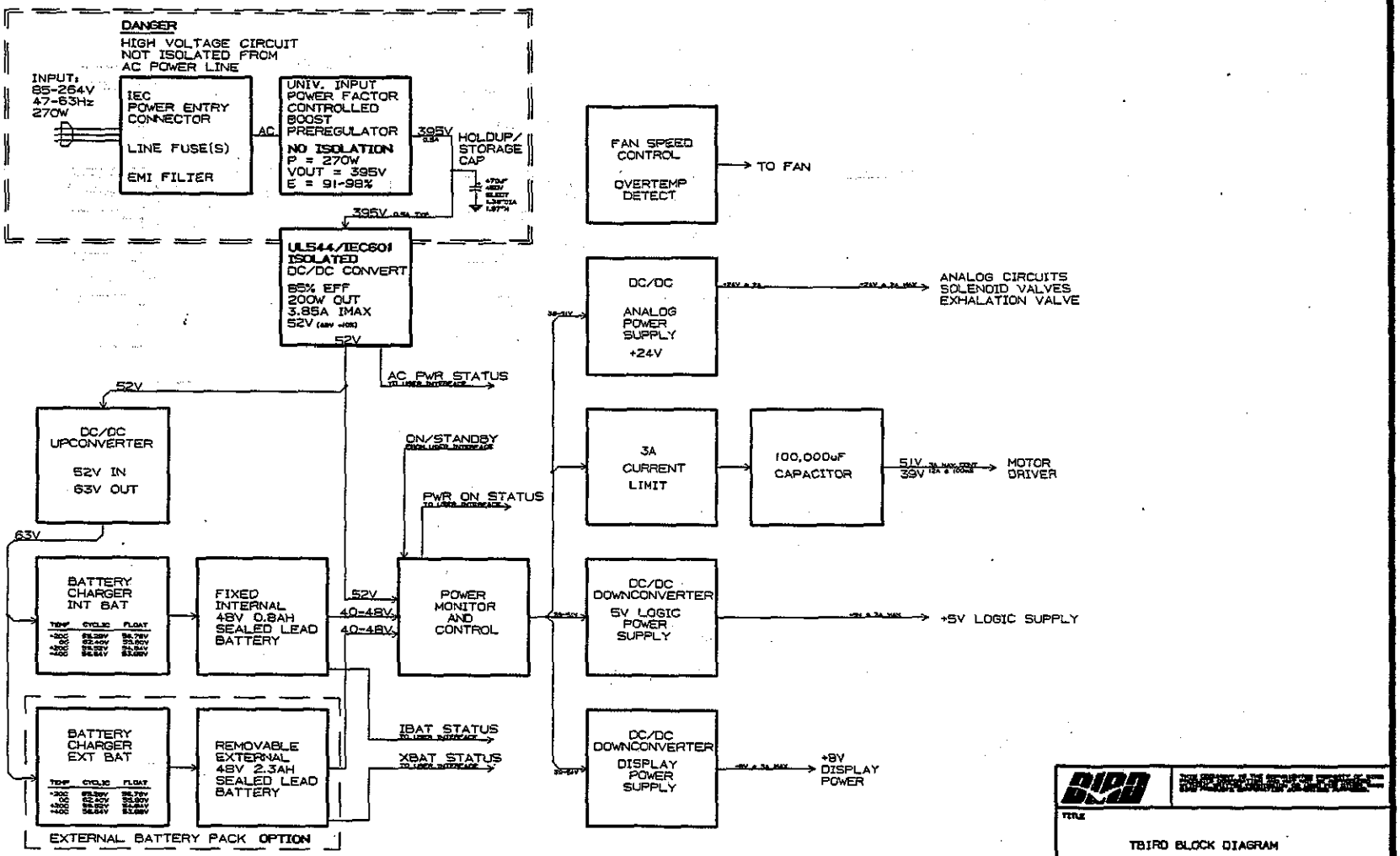

TO DAC'S
TO 5x7 DOT MATRIX DISPLAY
TO USER INTERFACE DISPLAY
TO/FROM ADC's
ADDRESS
DATA
TBIRD BLOCK DIAGRAM

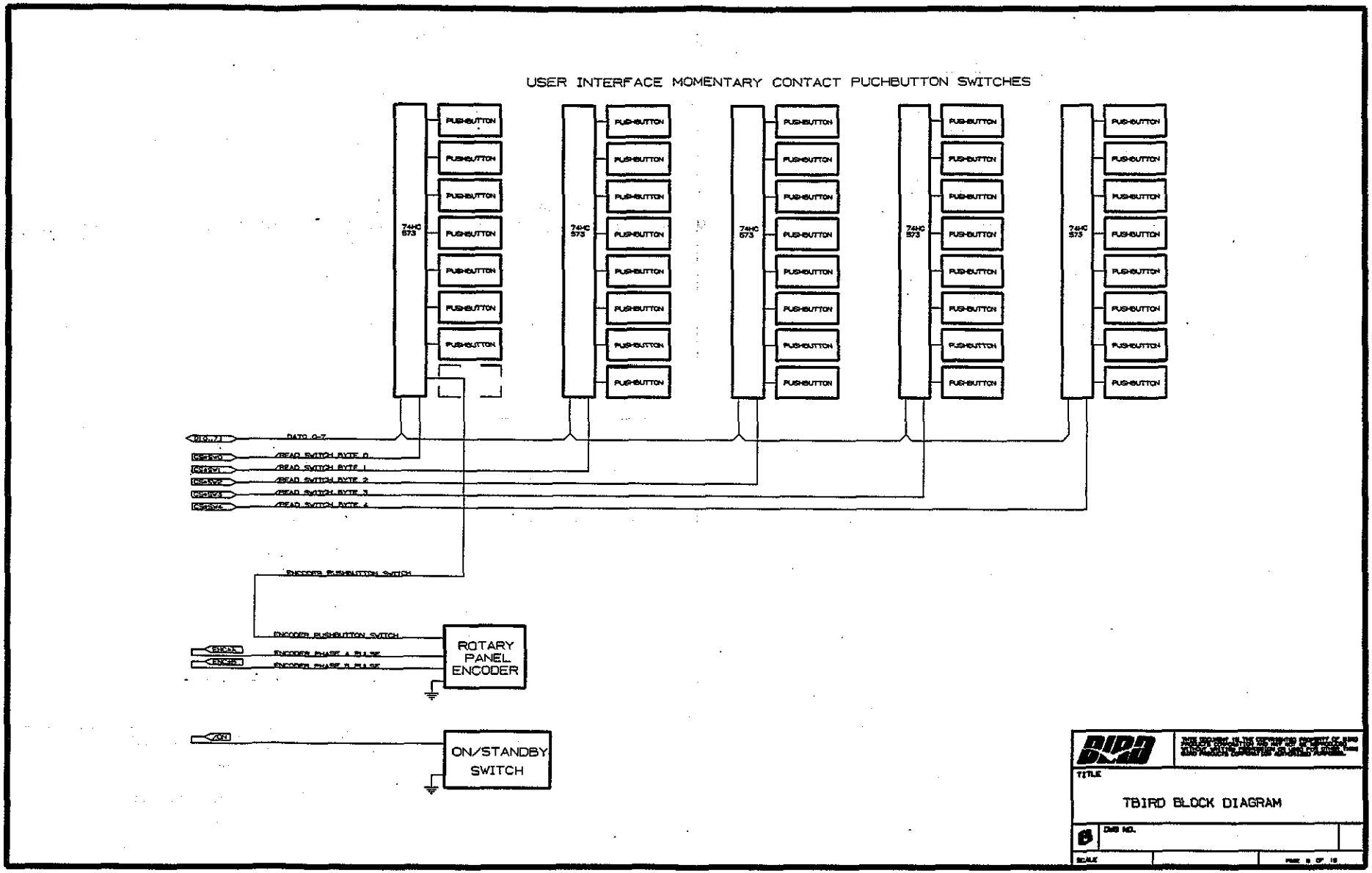

48-CHARACTER 5x7 DOT MATRIX ALPHANUMERIC DISPLAY
DATA
CLOCK
REG SEL
BLANK
/RESET
/OE
+VLED
RED ALARM DIGITS
GREEN CONTROL DIGITS
32-DIGIT DRIVER
32-DIGIT DRIVER
8 SEGMENT GRN DRIVER
8 SEGMENT GRN DRIVER
8 SEGMENT RED DRIVER
8 SEGMENT RED DRIVER
81-SEGMENT RED/GRN/YEL BARGRAPH DISPLAY
RED/GRN/YEL DISCRETE INDICATORS
6 DIGIT DRIVER
6 DIGIT DRIVER
TITLE
TBIRD BLOCK DIAGRAM
DWG NO.
SCALE

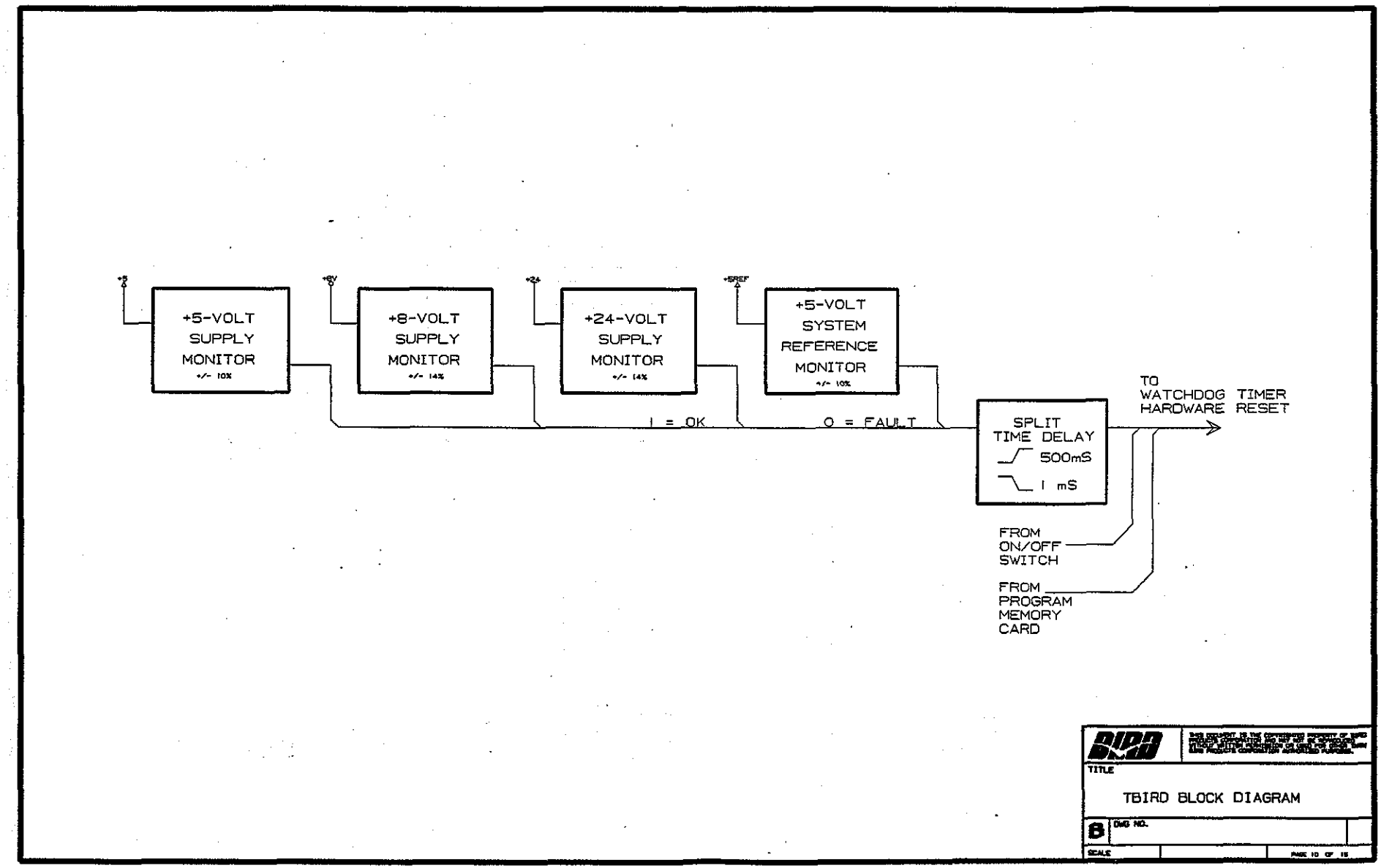
SCHEMATICS
TBIRD BLOCK

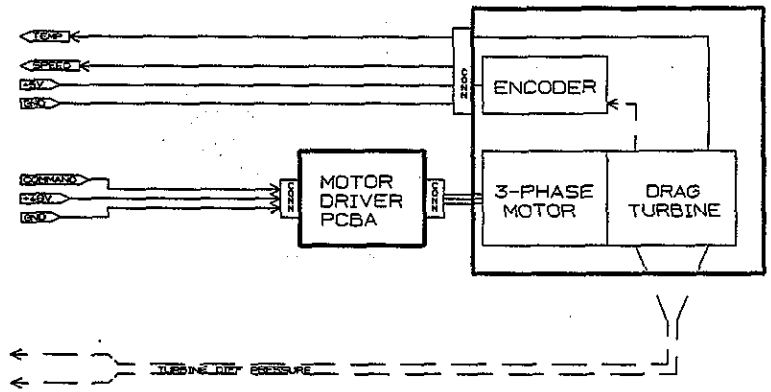



TO
PRESSURE
TRANSDUCERS
ON
MAIN PCBA
PATIENT CKT PRESSURE
TURBINE FLOW DIFF PRESSURE
AUTOZERO VALVE
AUTOZERO VALVE
AUTOZERO VALVE
PATIENT CKT PRESSURE
AMBIENT AIR
TURBINE FLOW DIFF PRESSURE
AMBIENT AIR
FROM
EXHL
VALVE
FROM
TURBINE
+24V
GND
/INH
/RESET10
POWER
CONTROL
5V, 24V
A00..7
D0
D4
D5
D0..
D0..D4
SOLENOID
VALVE
DRIVER
SOLENOID
VALVE
DRIVER
SOLENOID
VALVE
DRIVER
SOLENOID
VALVE
DRIVER
SOLENOID
VALVE
DRIVERS
/CS1E0
/WR
/CS1E7
/WR
J2001
J2002
TO
OPTIONAL
INSPIRATORY
HOLD VALVE
24V
VALVE1
VALVE2
VALVE3
VALVE4
VALVE5
OXYGEN PRESSURE
TO/FROM
OPTIONAL
BLENDER
OXYPRES
TITLE
TBIRD BLOCK DIAGRAM
DWG NO.
6
SCALE


DANGER
HIGH VOLTAGE CIRCUIT
NOT ISOLATED FROM
AC POWER LINE
INPUT:
85-264V
47-63Hz
270W
IEC
POWER ENTRY
CONNECTOR
LINE FUSE(S)
EMI FILTER
AC
UNIV. INPUT
POWER FACTOR
CONTROLLED
BOOST
PREREGULATOR
NO ISOLATION
P = 270W
VOUT = 395V
E = 91-98%
395V
HOLDUP/
STORAGE
CAP
395V
UL544/IEC601
ISOLATED
DC/DC CONVERT
85% EFF
200W OUT
3.85A IMAX
52V
52V
AC PWR STATUS
52V
DC/DC
UPCONVERTER
52V IN
63V OUT
63V
ON/STANDBY
PWR ON STATUS
BATTERY
CHARGER
INT BAT
FIXED
INTERNAL
48V 0.8AH
SEALED LEAD
BATTERY
52V
40-48V
40-48V
POWER
MONITOR
AND
CONTROL
BATTERY
CHARGER
EXT BAT
REMOVABLE
EXTERNAL
48V 2.3AH
SEALED LEAD
BATTERY
IBAT STATUS
XBAT STATUS
EXTERNAL BATTERY PACK OPTION
FAN SPEED
CONTROL
OVERTEMP
DETECT
TO FAN
DC/DC
ANALOG
POWER
SUPPLY
+24V
ANALOG CIRCUITS
SOLENOID VALVES
EXHALATION VALVE
3A
CURRENT
LIMIT
100,000uF
CAPACITOR
51V
39V
MOTOR
DRIVER
DC/DC
DOWNCONVERTER
5V LOGIC
POWER
SUPPLY
+5V LOGIC SUPPLY
DC/DC
DOWNCONVERTER
DISPLAY
POWER
SUPPLY
+8V
DISPLAY
POWER
TITLE
TBIRD BLOCK DIAGRAM


USER INTERFACE MOMENTARY CONTACT PUCHBUTTON SWITCHES
74HC 573
PUSHBUTTON
DATA 0-7
/READ SWITCH BYTE 0
/READ SWITCH BYTE 1
/READ SWITCH BYTE 2
/READ SWITCH BYTE 3
/READ SWITCH BYTE 4
ENCODER PUSHBUTTON SWITCH
ENCODER PUSHBUTTON SWITCH
ENCODER PHASE A PULSE
ENCODER PHASE B PULSE
ROTARY PANEL ENCODER
/ON
ON/STANDBY SWITCH
TITLE
TBIRD BLOCK DIAGRAM
DWG NO.
SCALE


+5
+8V
+24
+5REF
+5-VOLT SUPPLY MONITOR
+/- 10%
+8-VOLT SUPPLY MONITOR
+/- 14%
+24-VOLT SUPPLY MONITOR
+/- 14%
+5-VOLT SYSTEM REFERENCE MONITOR
+/- 10%
1 = OK
0 = FAULT
SPLIT TIME DELAY
500mS
1 mS
TO WATCHDOG TIMER HARDWARE RESET
FROM ON/OFF SWITCH
FROM PROGRAM MEMORY CARD
TITLE
TBIRD BLOCK DIAGRAM
8
DWG NO.
SCALE



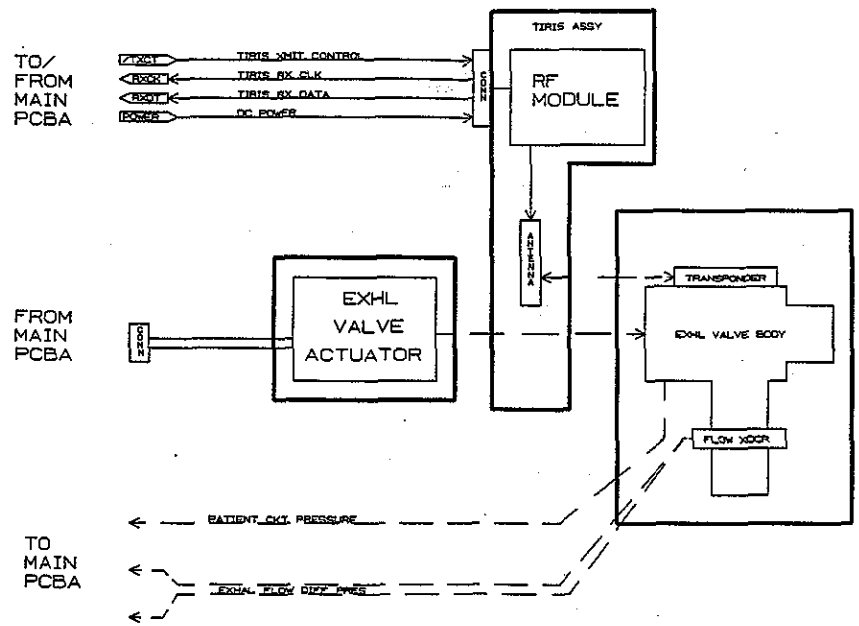
TITLE

TBIRD BLOCK DIAGRAM

SIZE B | DWG NO.

SCALE

PAGE 11 OF 15



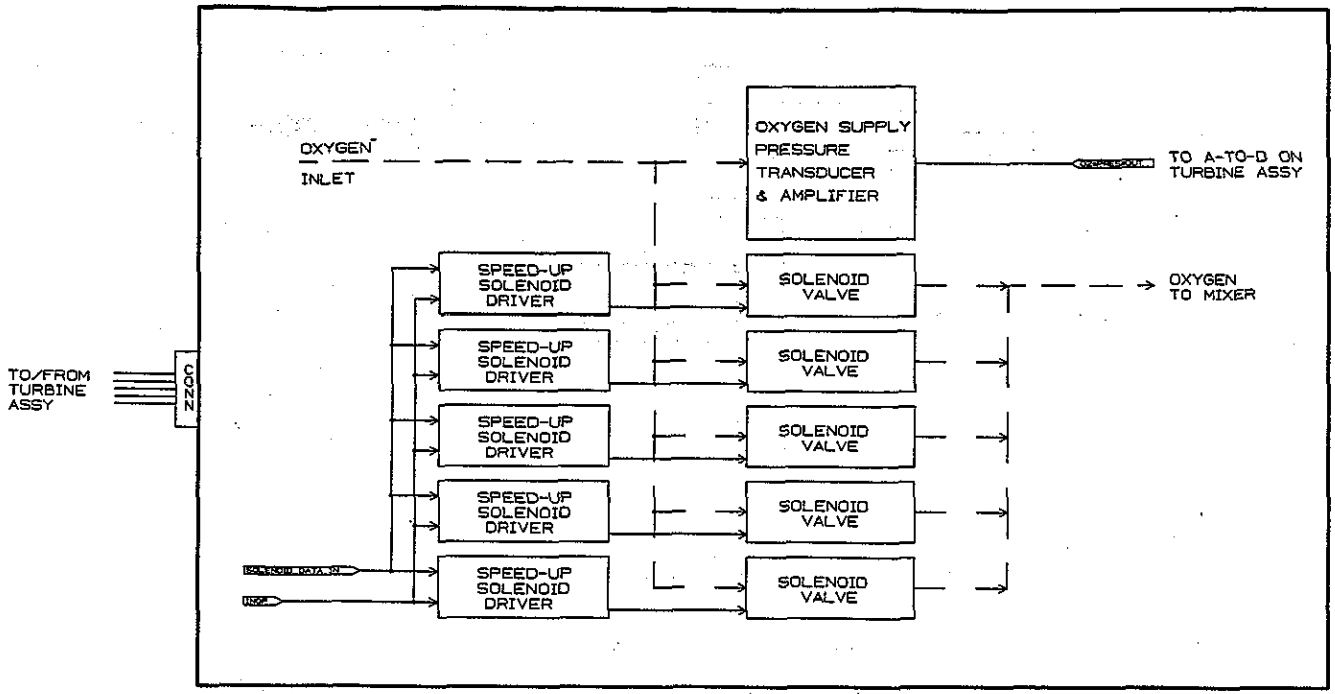
TITLE

TBIRD BLOCK DIAGRAM

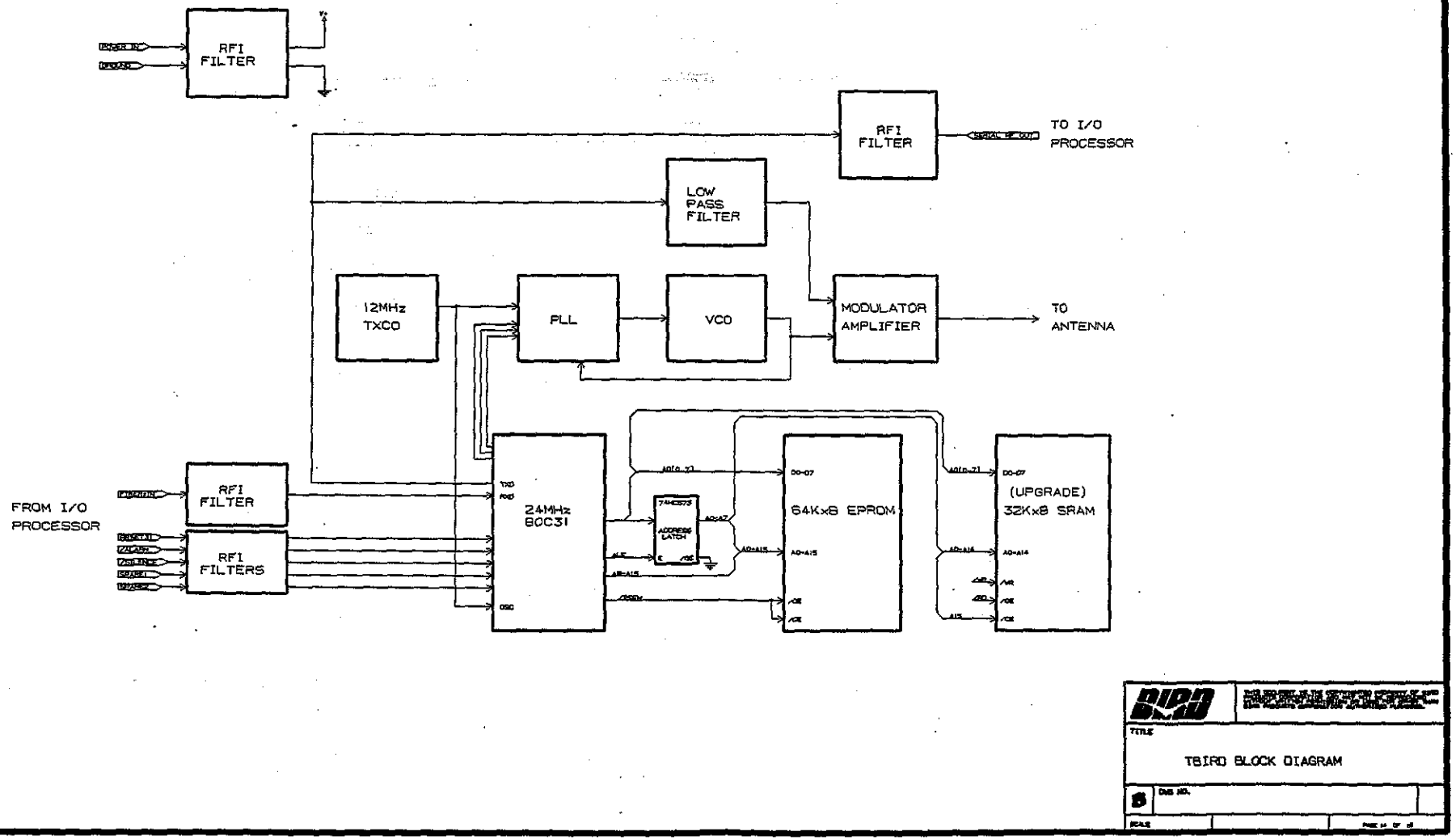
B

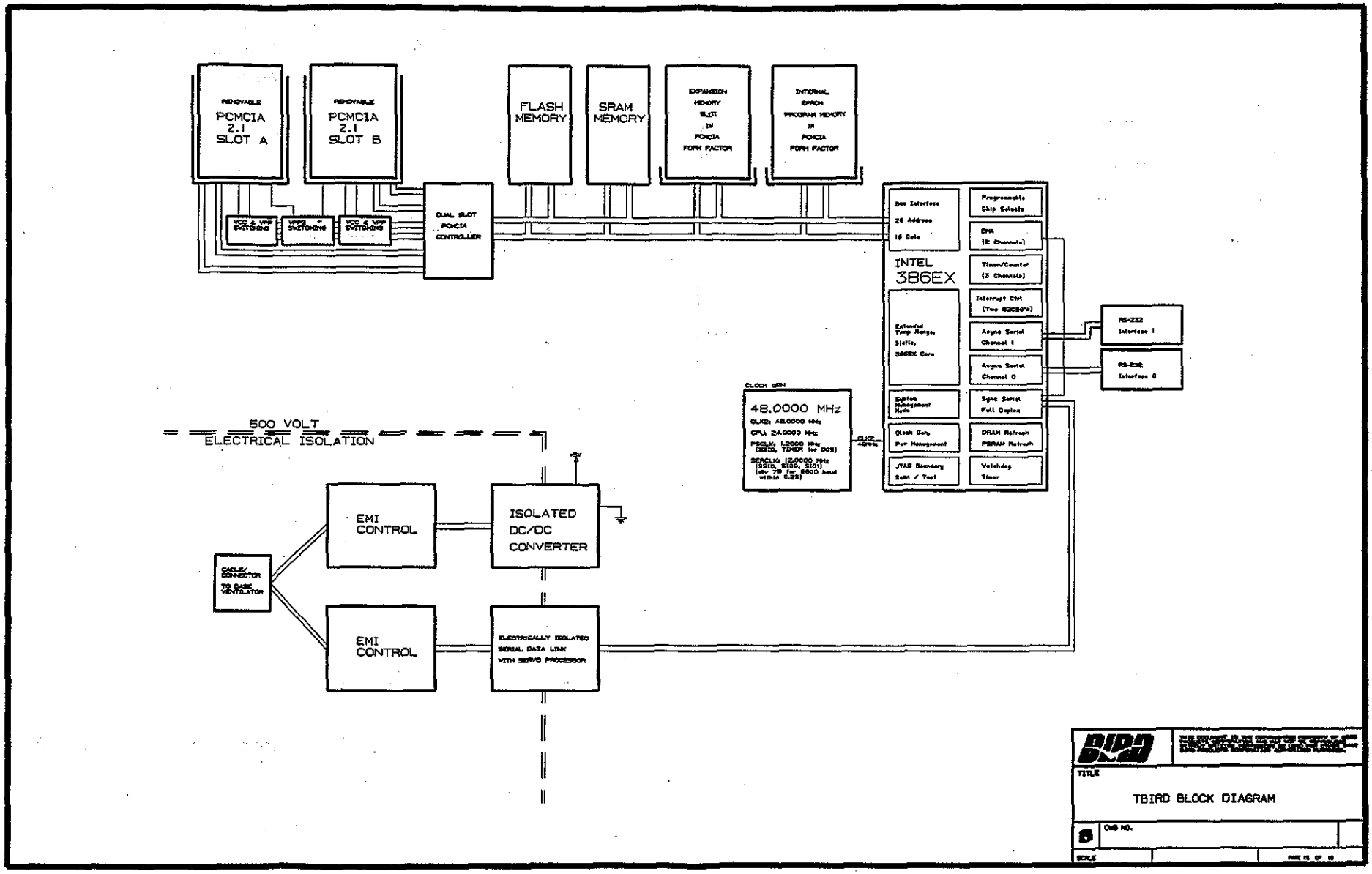
DWG NO.

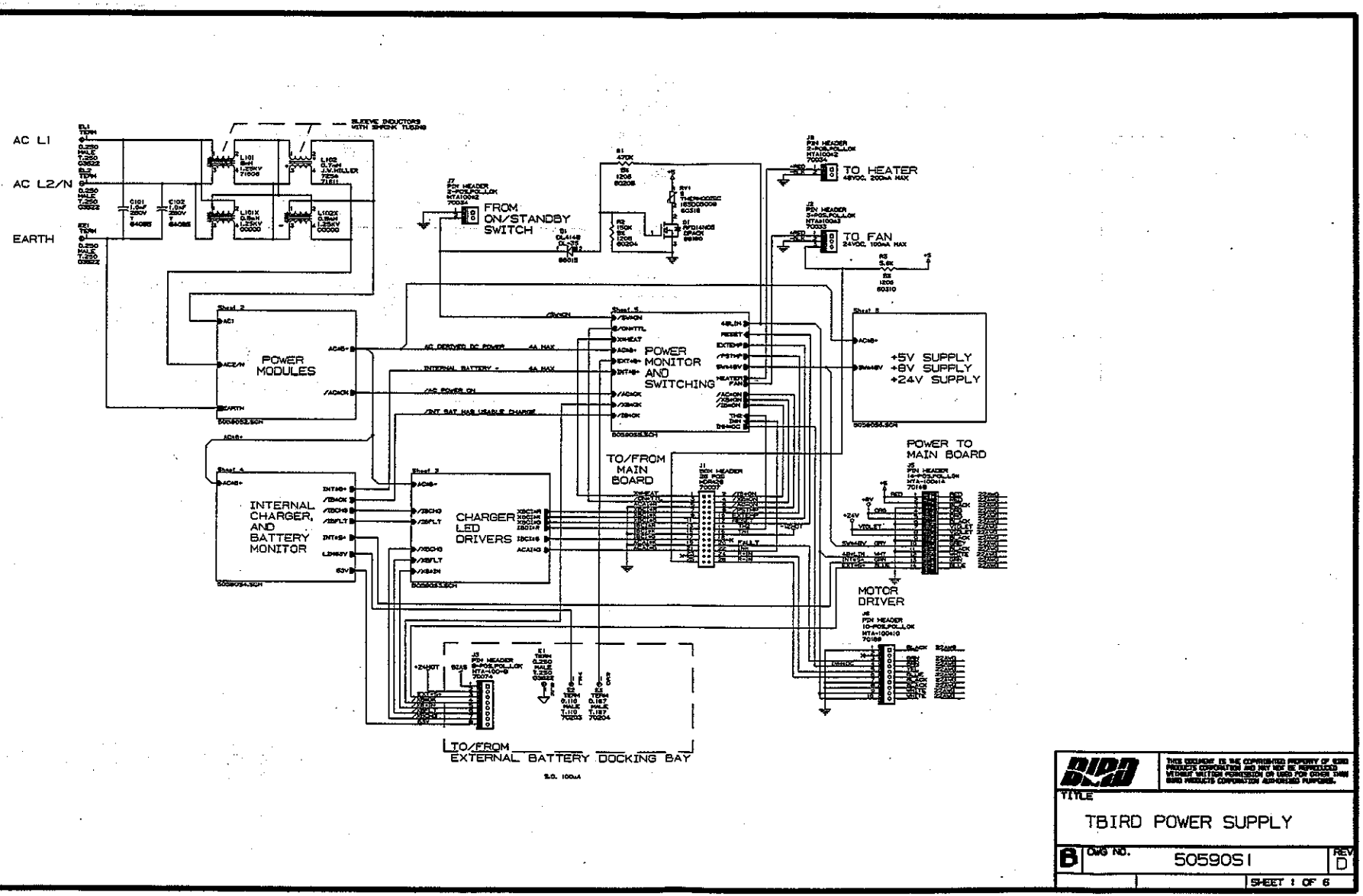
SCALE

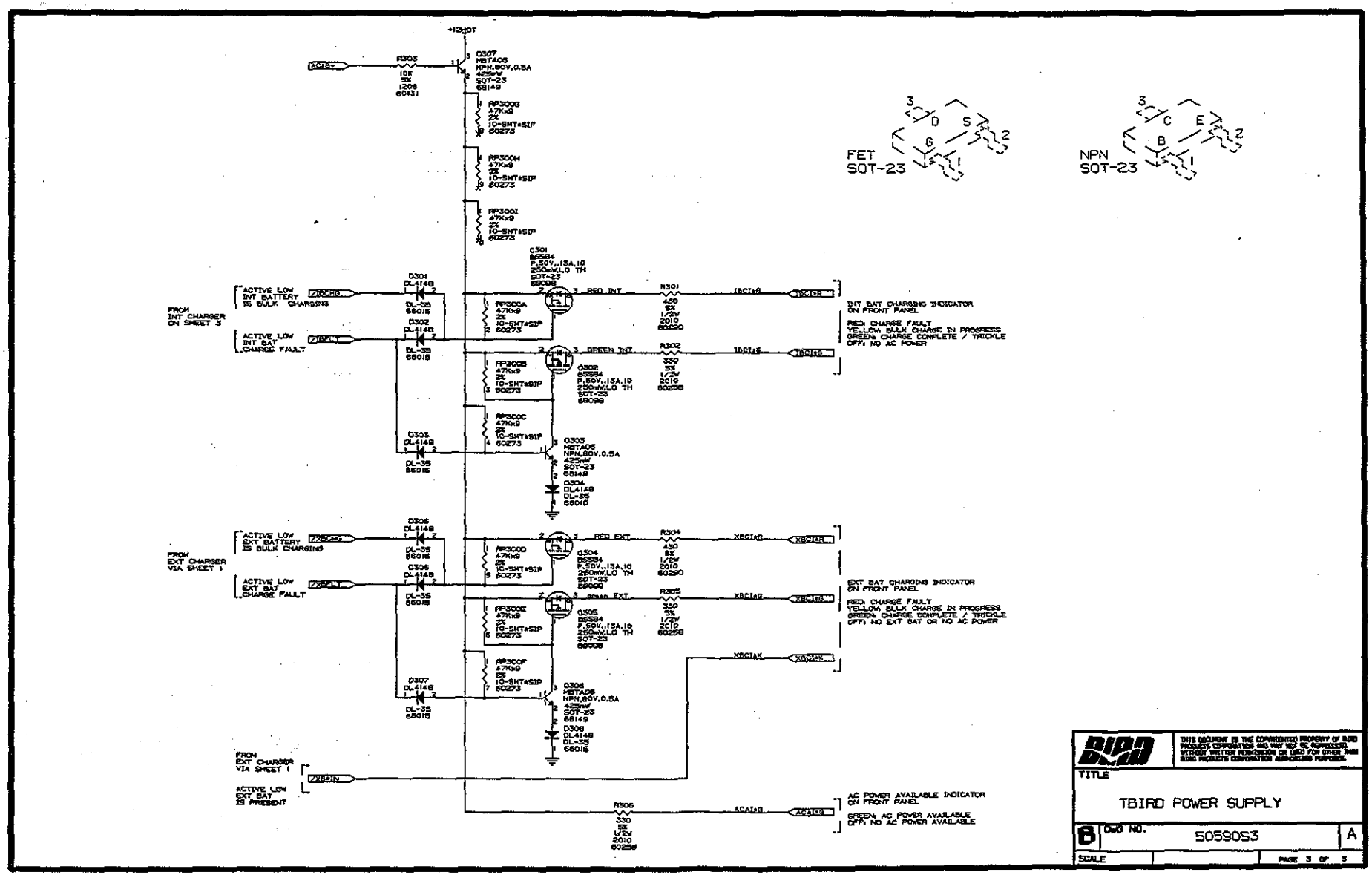


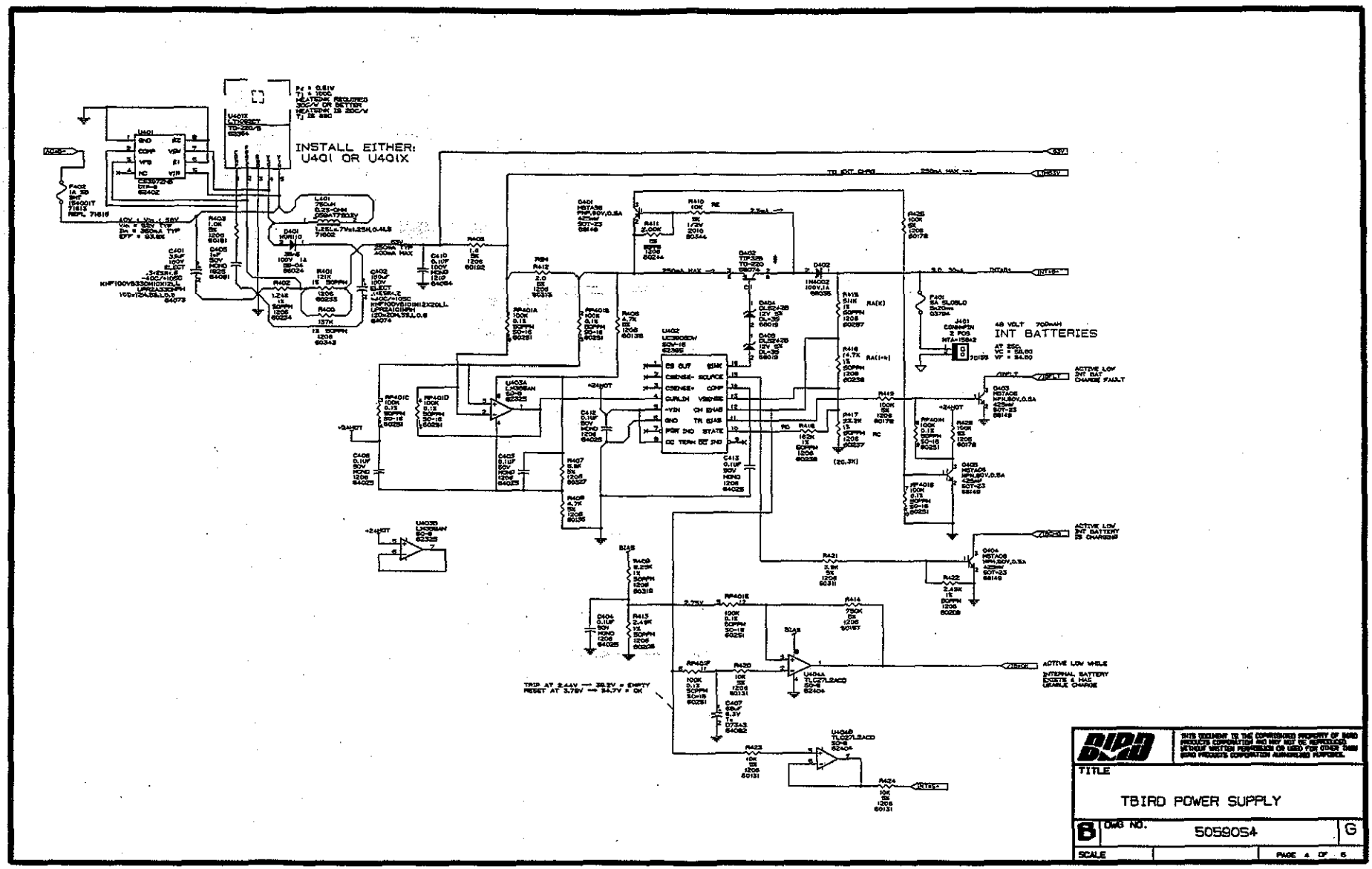
TBIRD BLOCK DIAGRAM

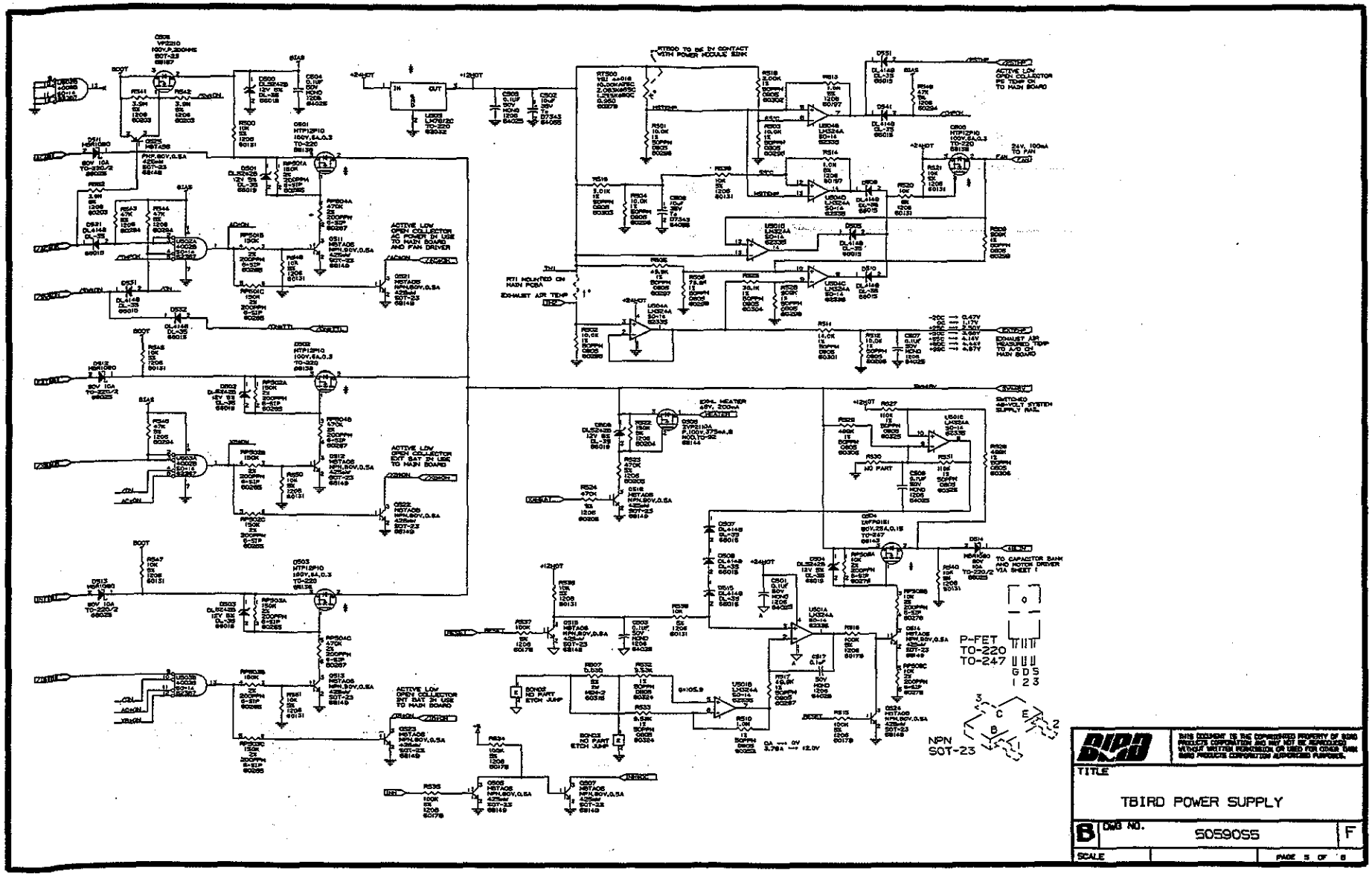

RFI FILTER
RFI FILTER
TO I/O PROCESSOR
LOW PASS FILTER
12MHz TXCO
PLL
VCO
MODULATOR AMPLIFIER
TO ANTENNA
FROM I/O PROCESSOR
RFI FILTER
RFI FILTERS
24MHz 80C31
64Kx8 EPROM
(UPGRADE) 32Kx8 SRAM
TBIRD BLOCK DIAGRAM


REMOVABLE
PCMCIA
2.1
SLOT A
REMOVABLE
PCMCIA
2.1
SLOT B
FLASH
MEMORY
SRAM
MEMORY
EXPANSION
MEMORY
SLOT
IN
PCMCIA
FORM FACTOR
INTERNAL
EPROM
PROGRAM MEMORY
IN
PCMCIA
FORM FACTOR
VCC & VPP
SWITCHING
VPP2
SWITCHING
VCC & VPP
SWITCHING
DUAL SLOT
PCMCIA
CONTROLLER
Bus Interface
24 Address
16 Data
Programmable
Chip Selects
DMA
(2 Channels)
INTEL
386EX
Timer/Counter
(3 Channels)
Interrupt Ctrl
(Two 82C59's)
Extended
Temp Range,
Static,
386EX Core
Async Serial
Channel 1
Async Serial
Channel 0
RS-232
Interface 1
RS-232
Interface 0
System
Management
Mode
Sync Serial
Full Duplex
Clock Gen.
Pwr Management
DRAM Refresh
PSRAM Refresh
JTAG Boundary
Scan / Test
Watchdog
Timer
CLOCK GEN
48.0000 MHz
CLK2: 48.0000 MHz
CPU: 24.0000 MHz
PSCLK: 12.0000 MHz
(SSIO, TIMER for DOS)
SERCLK: 12.0000 MHz
(SSIO, SIO0, SIO1)
(div 78 for 9600 baud
within 0.2%)
CLK2
48MHz
500 VOLT
ELECTRICAL ISOLATION
+5V
EMI
CONTROL
ISOLATED
DC/DC
CONVERTER
CABLE/
CONNECTOR
TO BASE
VENTILATOR
EMI
CONTROL
ELECTRICALLY ISOLATED
SERIAL DATA LINK
WITH SERVO PROCESSOR
TITLE
TBIRD BLOCK DIAGRAM
DWG NO.
SCALE


AC L1
AC L2/N
EARTH
FROM ON/STANDBY SWITCH
TO HEATER
48VDC, 200mA MAX
TO FAN
24VDC, 100mA MAX
POWER MODULES
POWER MONITOR AND SWITCHING
+5V SUPPLY
+8V SUPPLY
+24V SUPPLY
TO/FROM MAIN BOARD
POWER TO MAIN BOARD
INTERNAL CHARGER, AND BATTERY MONITOR
CHARGER LED DRIVERS
MOTOR DRIVER
TO/FROM EXTERNAL BATTERY DOCKING BAY
TITLE
TBIRD POWER SUPPLY
DWG NO.
50590S1
REV
D
SHEET 1 OF 6


+12VDT
FET
SOT-23
NPN
SOT-23
ACTIVE LOW
INT BATTERY
IS BULK CHARGING
ACTIVE LOW
INT BAT
CHARGE FAULT
FROM
INT CHARGER
ON SHEET 3
RED INT
GREEN INT
INT BAT CHARGING INDICATOR
ON FRONT PANEL
RED: CHARGE FAULT
YELLOW: BULK CHARGE IN PROGRESS
GREEN: CHARGE COMPLETE / TRICKLE
OFF: NO AC POWER
ACTIVE LOW
EXT BATTERY
IS BULK CHARGING
ACTIVE LOW
EXT BAT
CHARGE FAULT
FROM
EXT CHARGER
VIA SHEET 1
RED EXT
GREEN EXT
EXT BAT CHARGING INDICATOR
ON FRONT PANEL
RED: CHARGE FAULT
YELLOW: BULK CHARGE IN PROGRESS
GREEN: CHARGE COMPLETE / TRICKLE
OFF: NO EXT BAT OR NO AC POWER
FROM
EXT CHARGER
VIA SHEET 1
ACTIVE LOW
EXT BAT
IS PRESENT
AC POWER AVAILABLE INDICATOR
ON FRONT PANEL
GREEN: AC POWER AVAILABLE
OFF: NO AC POWER AVAILABLE
TITLE
TBIRD POWER SUPPLY
DWG NO.
5059053
A
SCALE
PAGE 3 OF 3


INSTALL EITHER:
U401 OR U401X
48 VOLT 700mAH
INT BATTERIES
ACTIVE LOW
INT BAT
CHARGE FAULT
ACTIVE LOW
INT BATTERY
IS CHARGING
ACTIVE LOW WHILE
INTERNAL BATTERY
EXISTS & HAS
USABLE CHARGE
TRIP AT 2.44V == 38.9V = EMPTY
RESET AT 3.78V == 54.7V = OK
TBIRD POWER SUPPLY
DWG NO.
5059054
SCALE
PAGE 4 OF 6


P-FET
TO-220
TO-247
G D S
1 2 3
NPN
SOT-23
TBIRD POWER SUPPLY
B
DWG NO.
5059055
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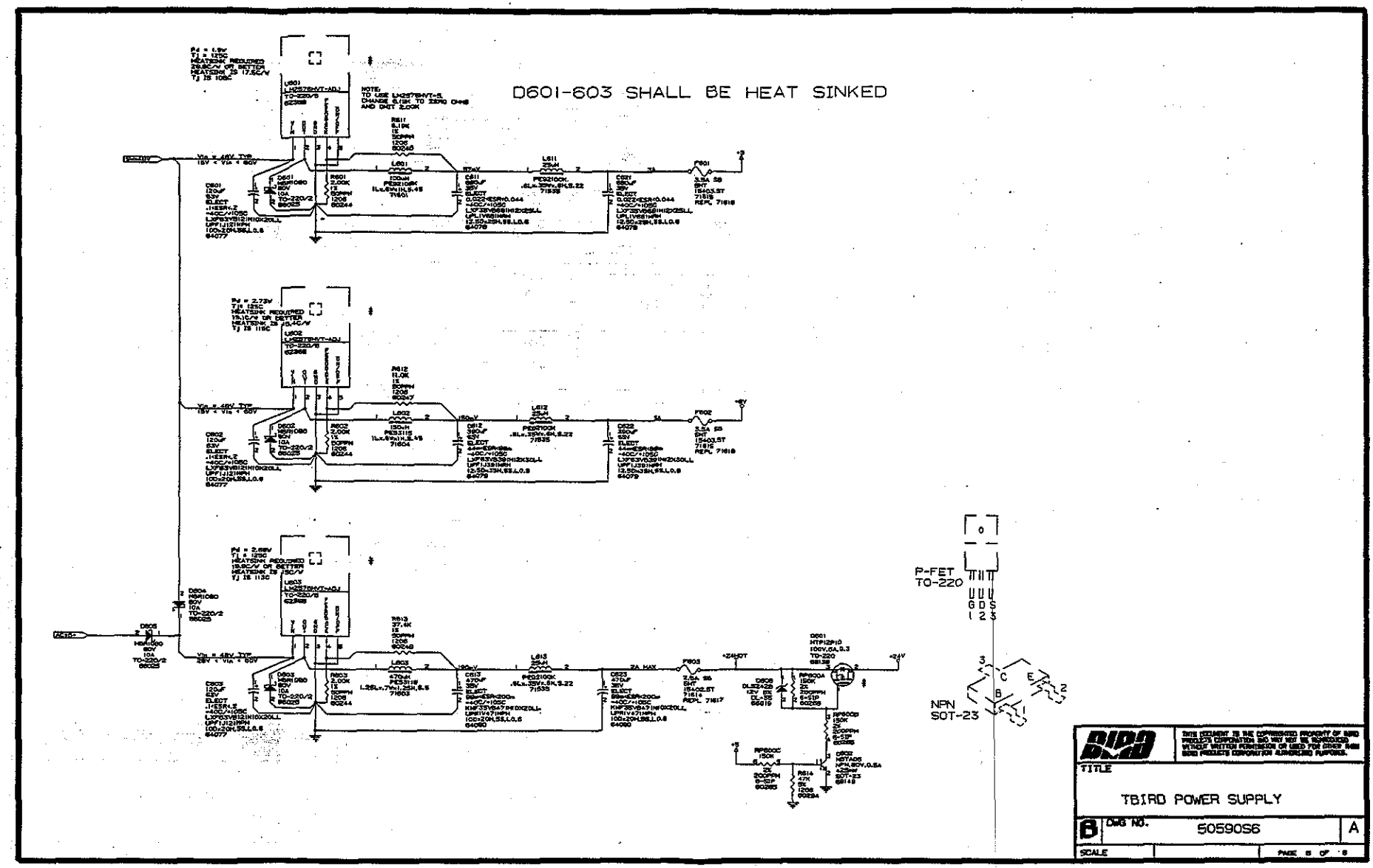
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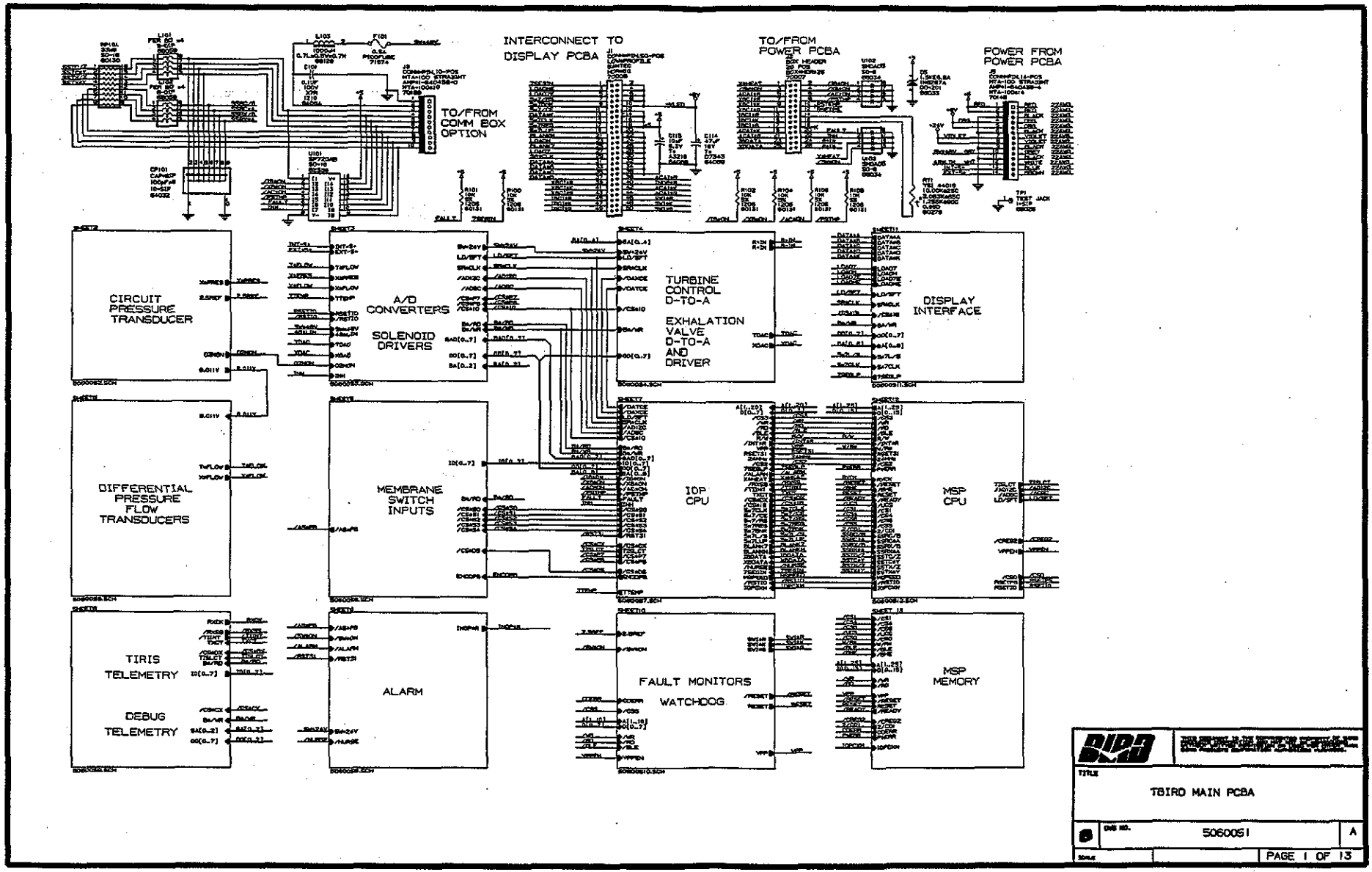
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TO/FROM
POWER PCBA
POWER FROM
POWER PCBA
TO/FROM
COMM BOX
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CIRCUIT
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TRANSDUCER
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CONVERTERS
SOLENOID
DRIVERS
TURBINE
CONTROL
D-TO-A
EXHALATION
VALVE
D-TO-A
AND
DRIVER
DISPLAY
INTERFACE
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FLOW
TRANSDUCERS
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INPUTS
IDP
CPU
MSP
CPU
TIRIS
TELEMETRY
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TELEMETRY
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WATCHDOG
MSP
MEMORY
TITLE
TBIRD MAIN PCBA
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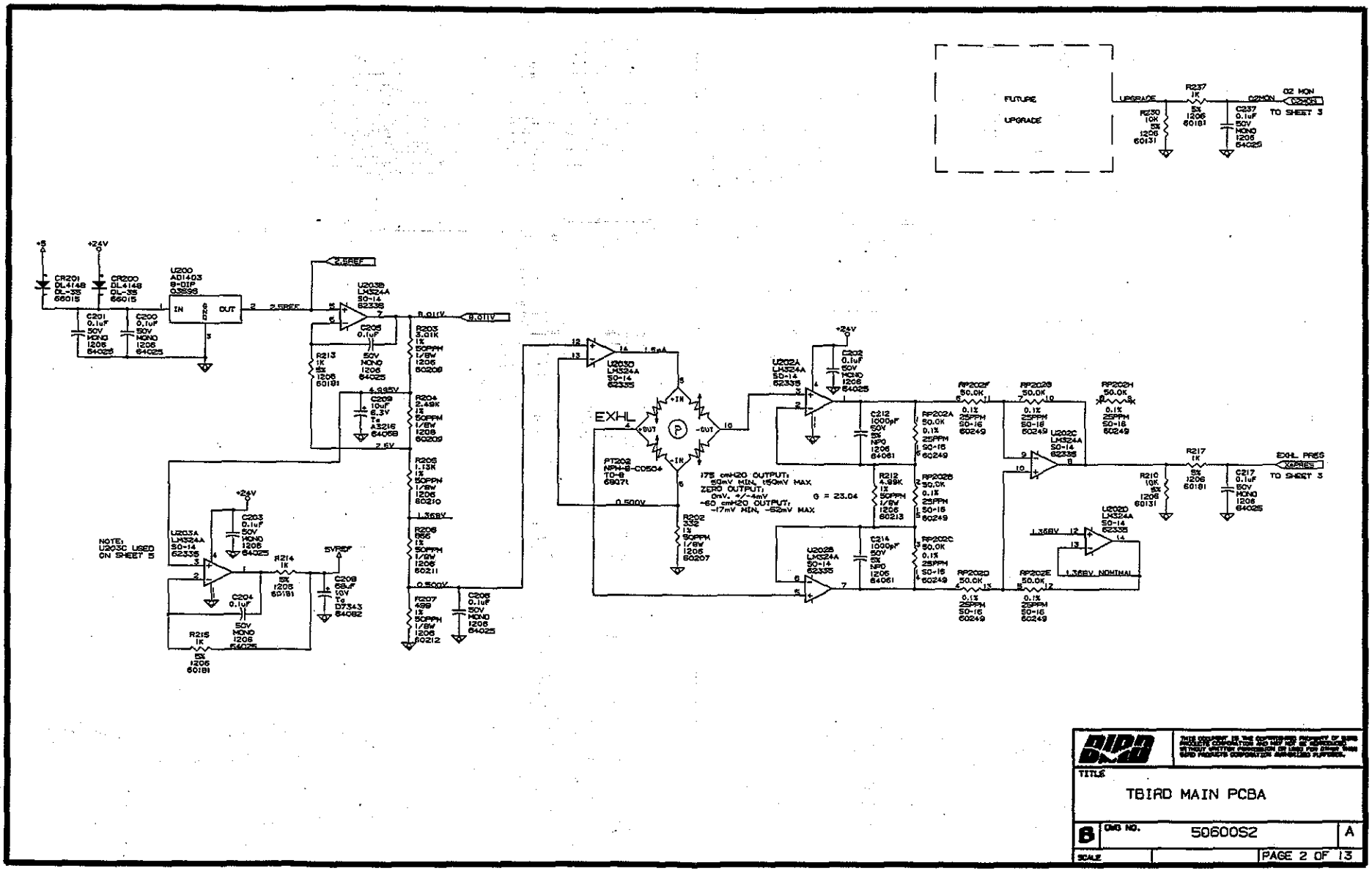
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EXHL
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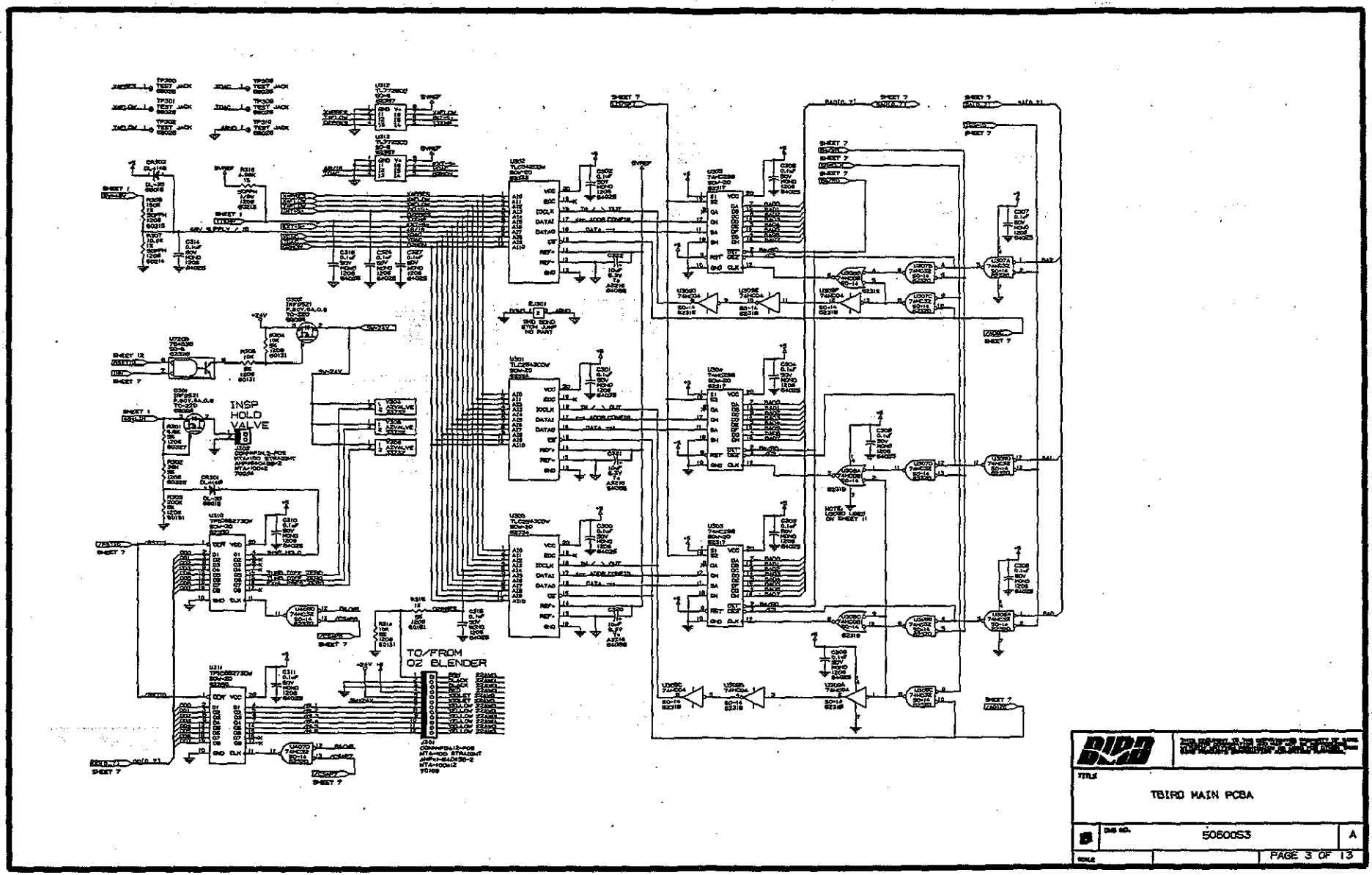
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O2 BLENDER
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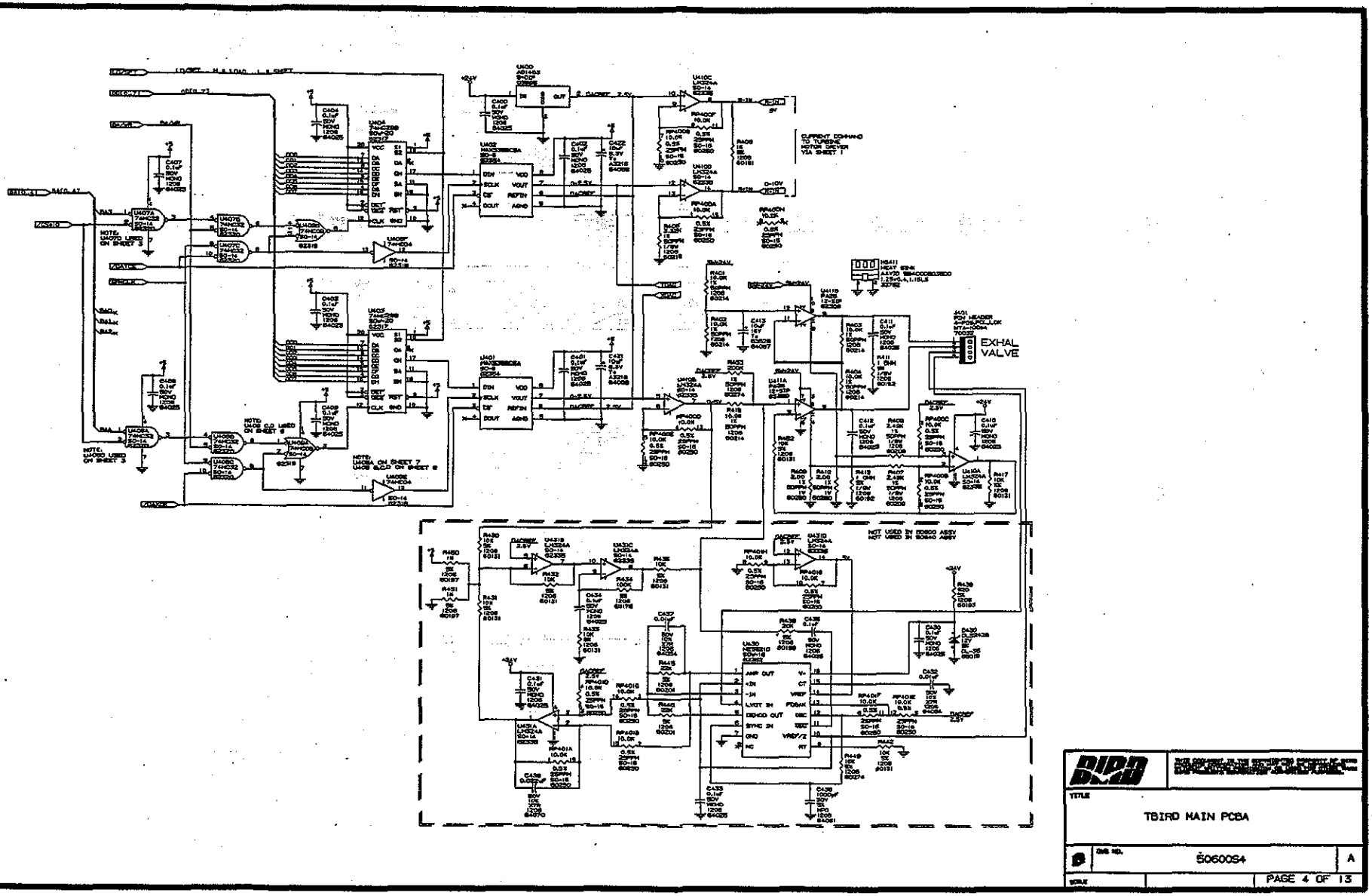
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VALVE
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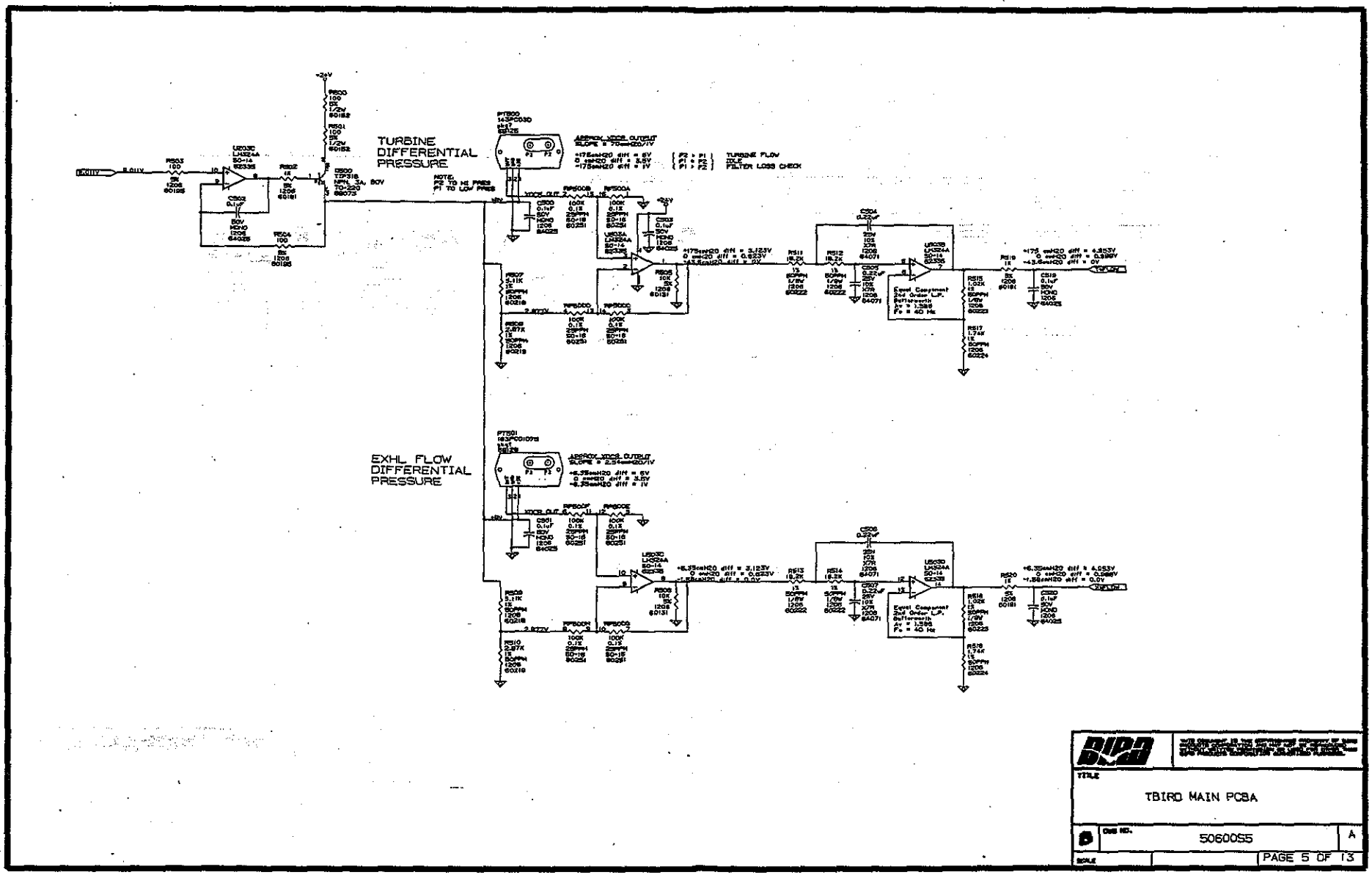
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EXHL FLOW
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PRESSURE
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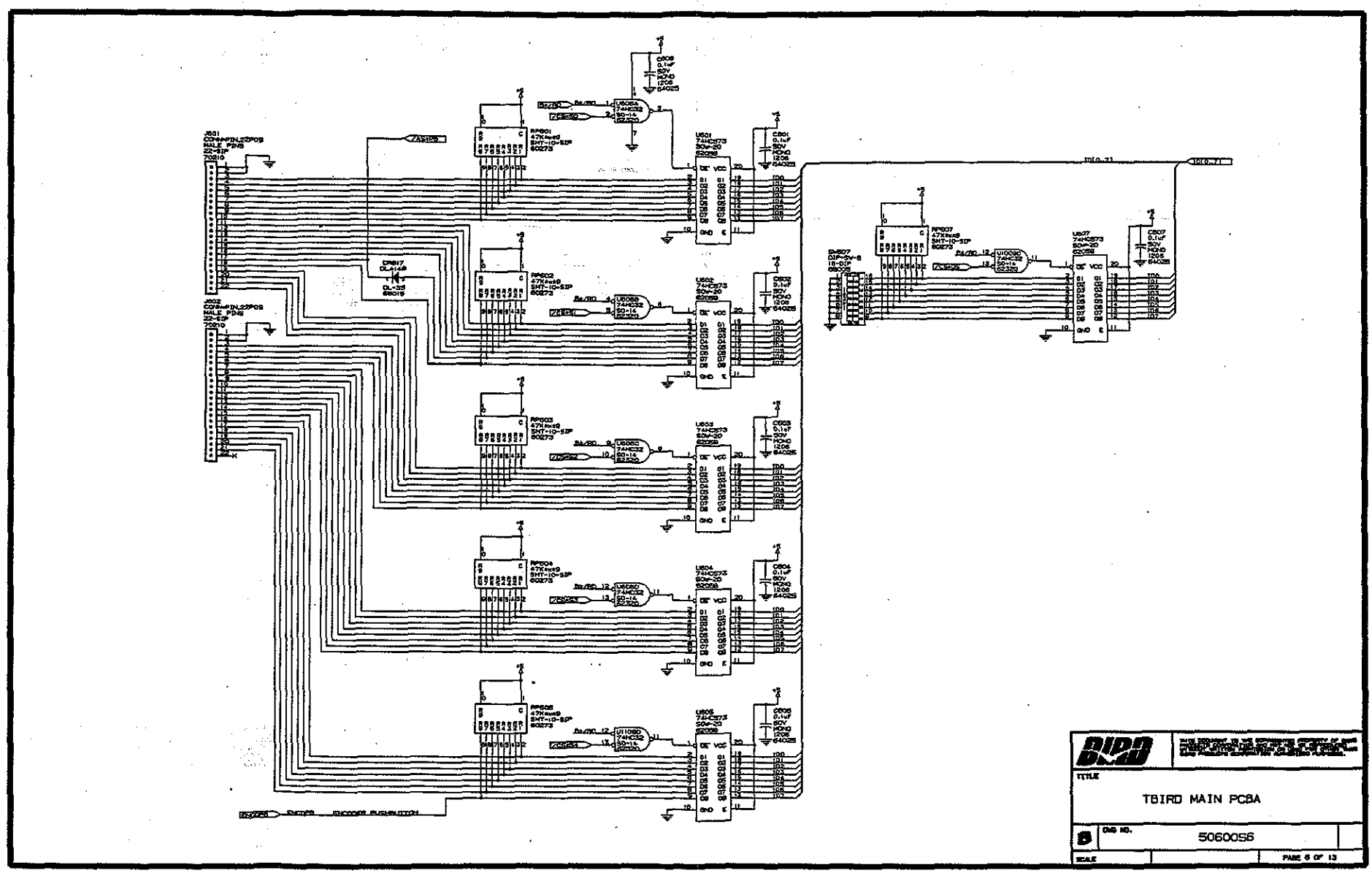
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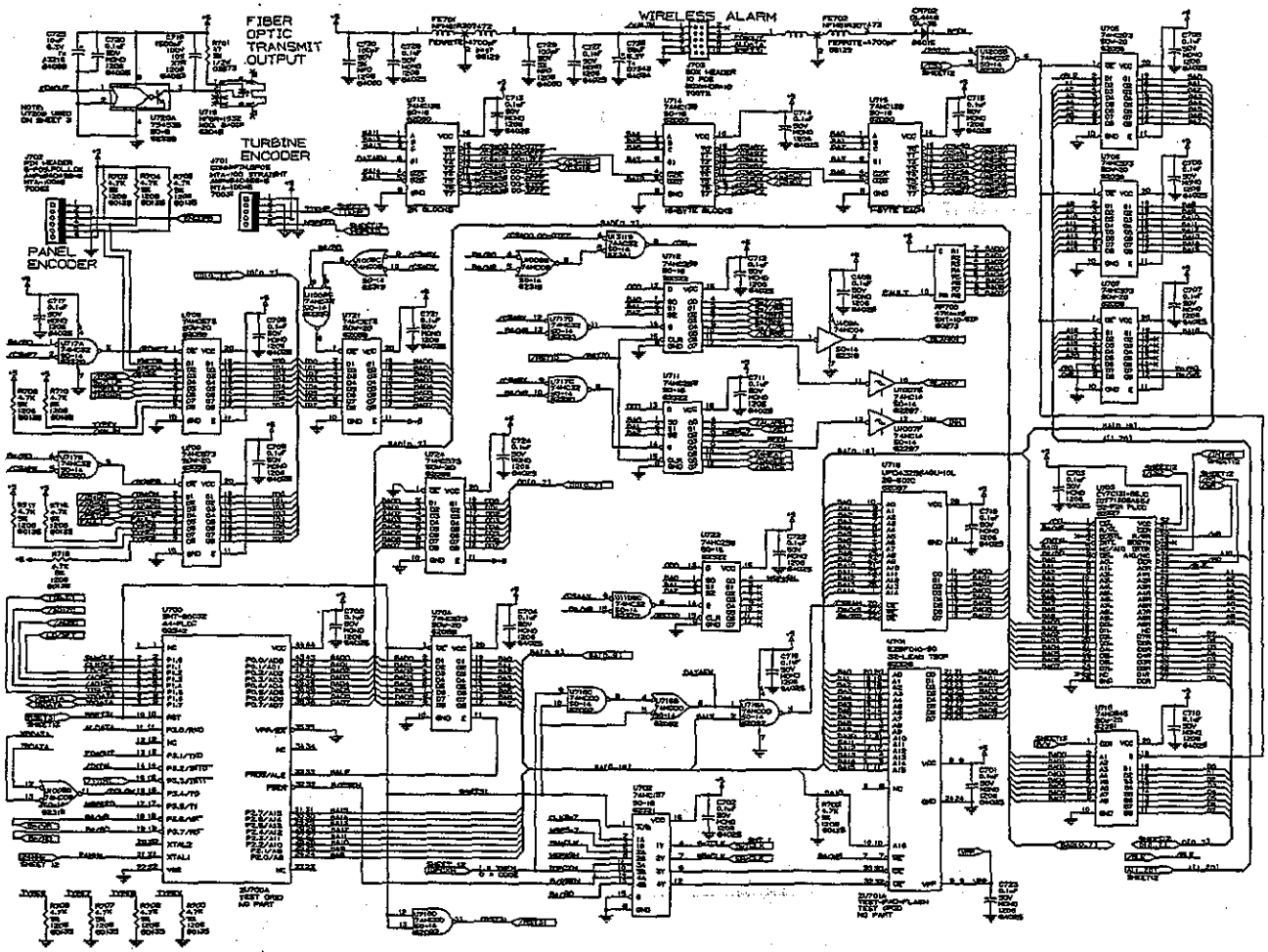

TBIRD MAIN PCBA

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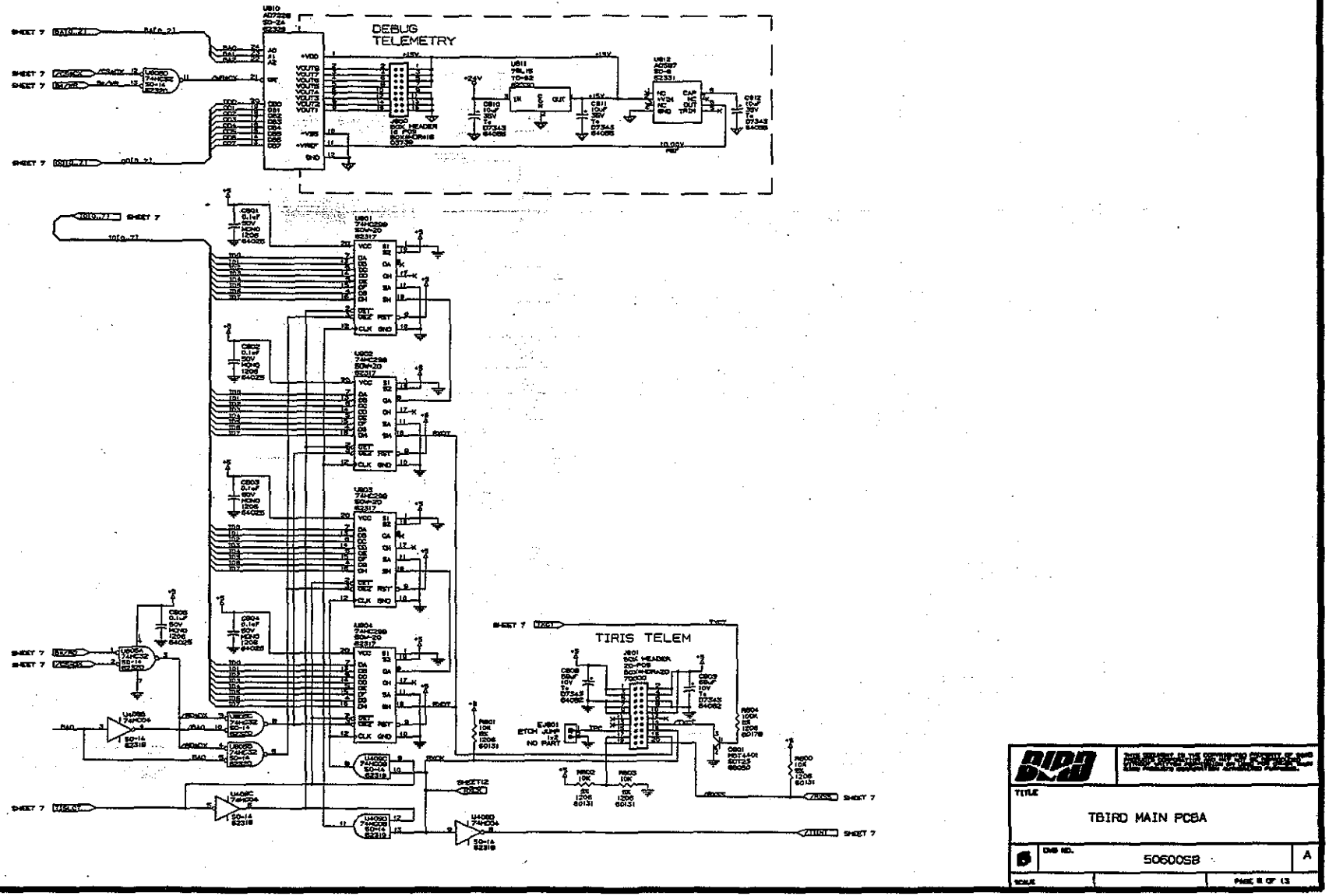
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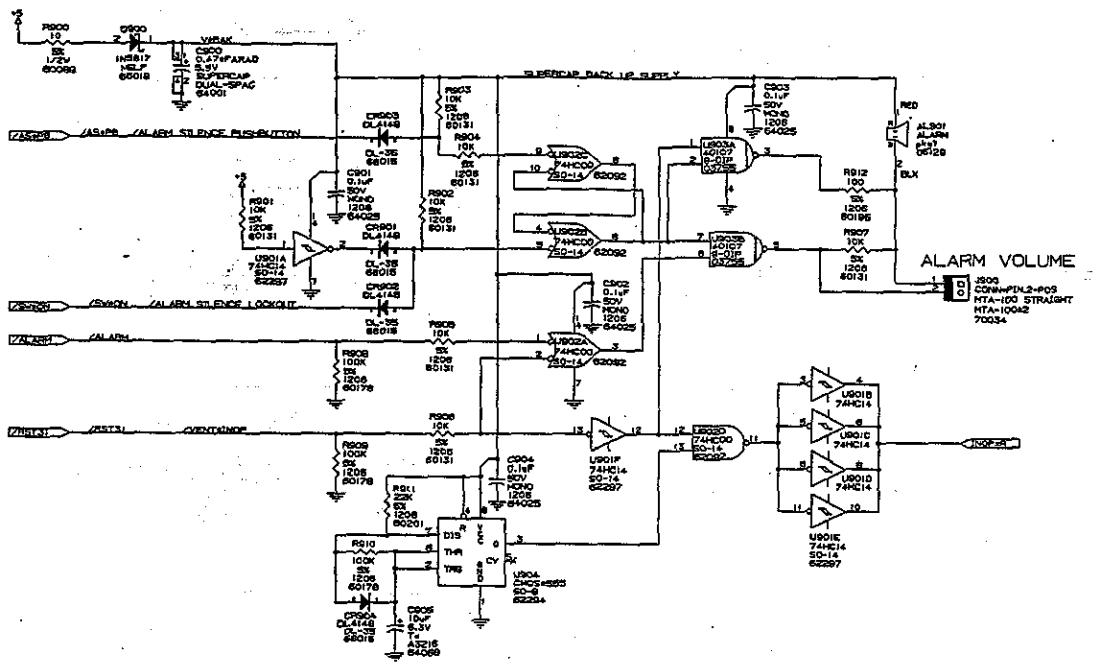
SHEET 12



TITLE

TBIRD MAIN PCBA

B	DWG NO. 50600S9	A
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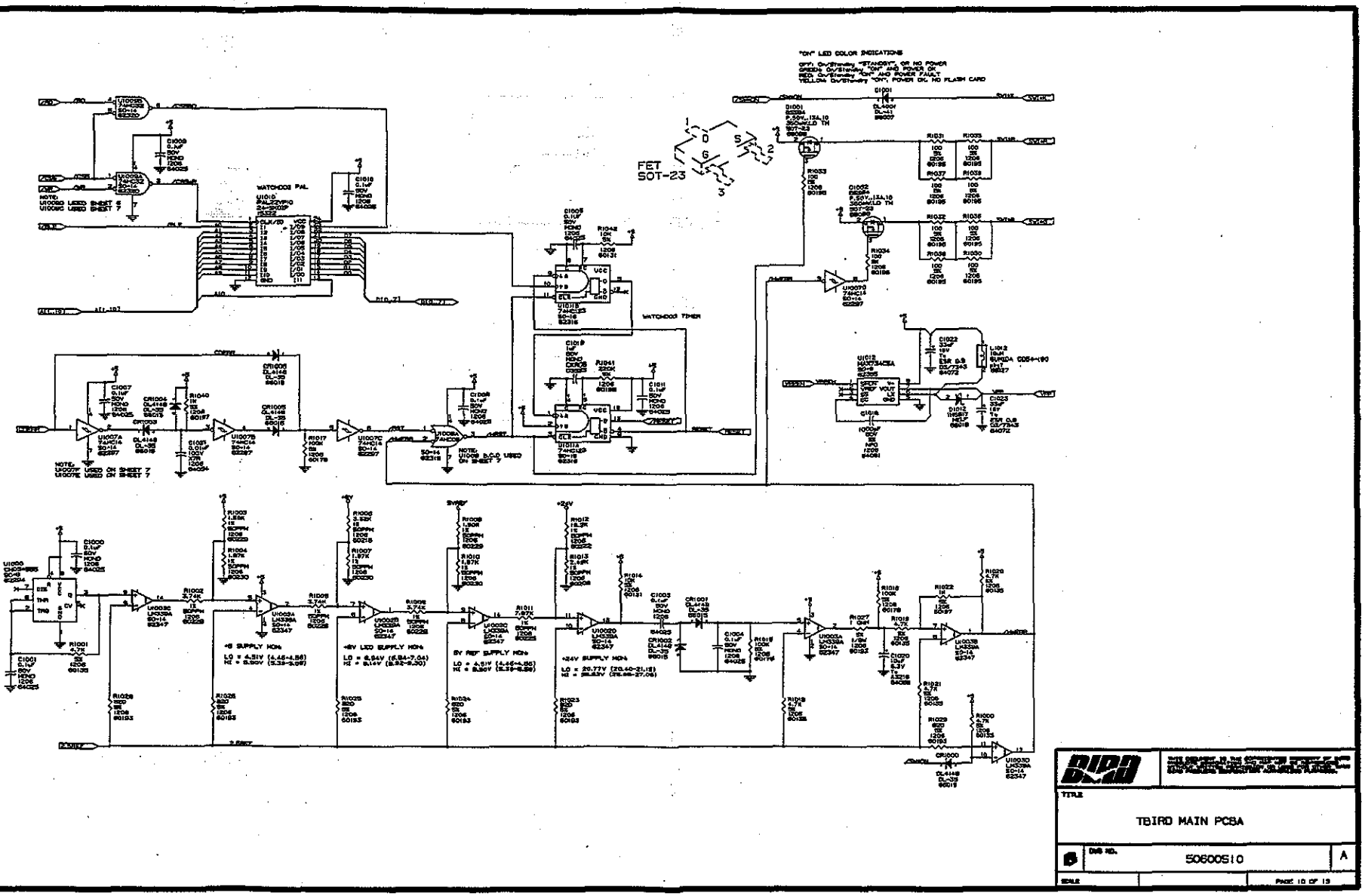
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WATCHDOG TIMER
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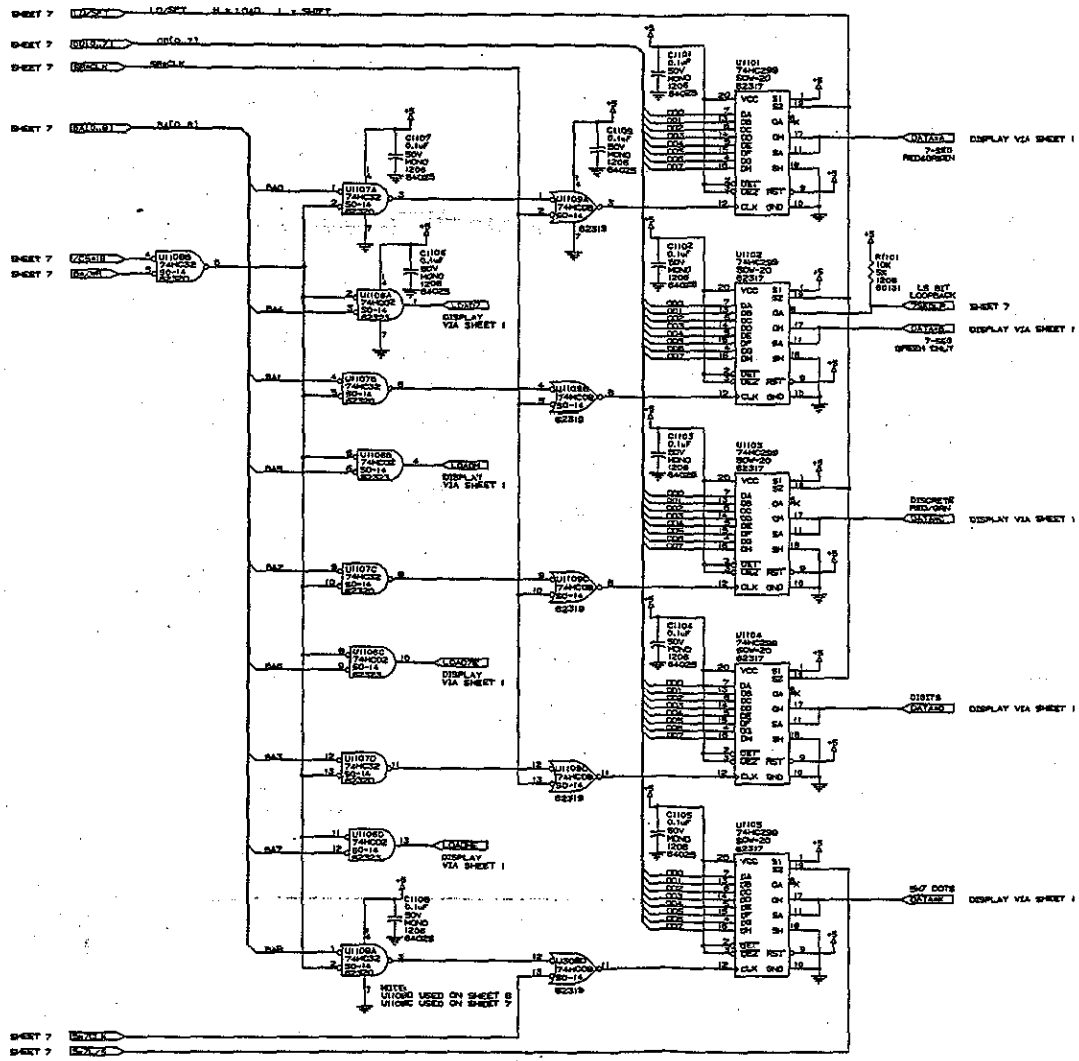
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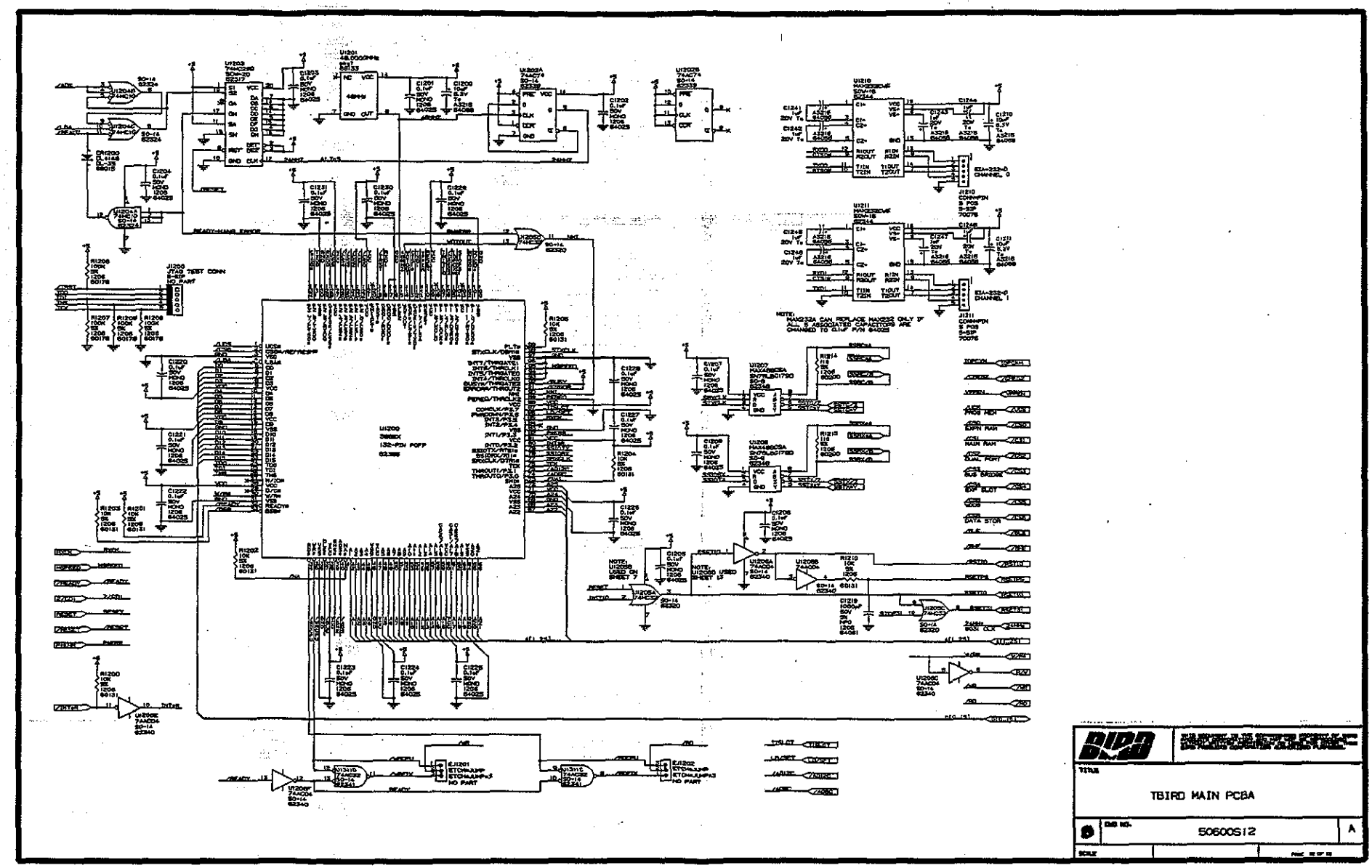
SHEET 7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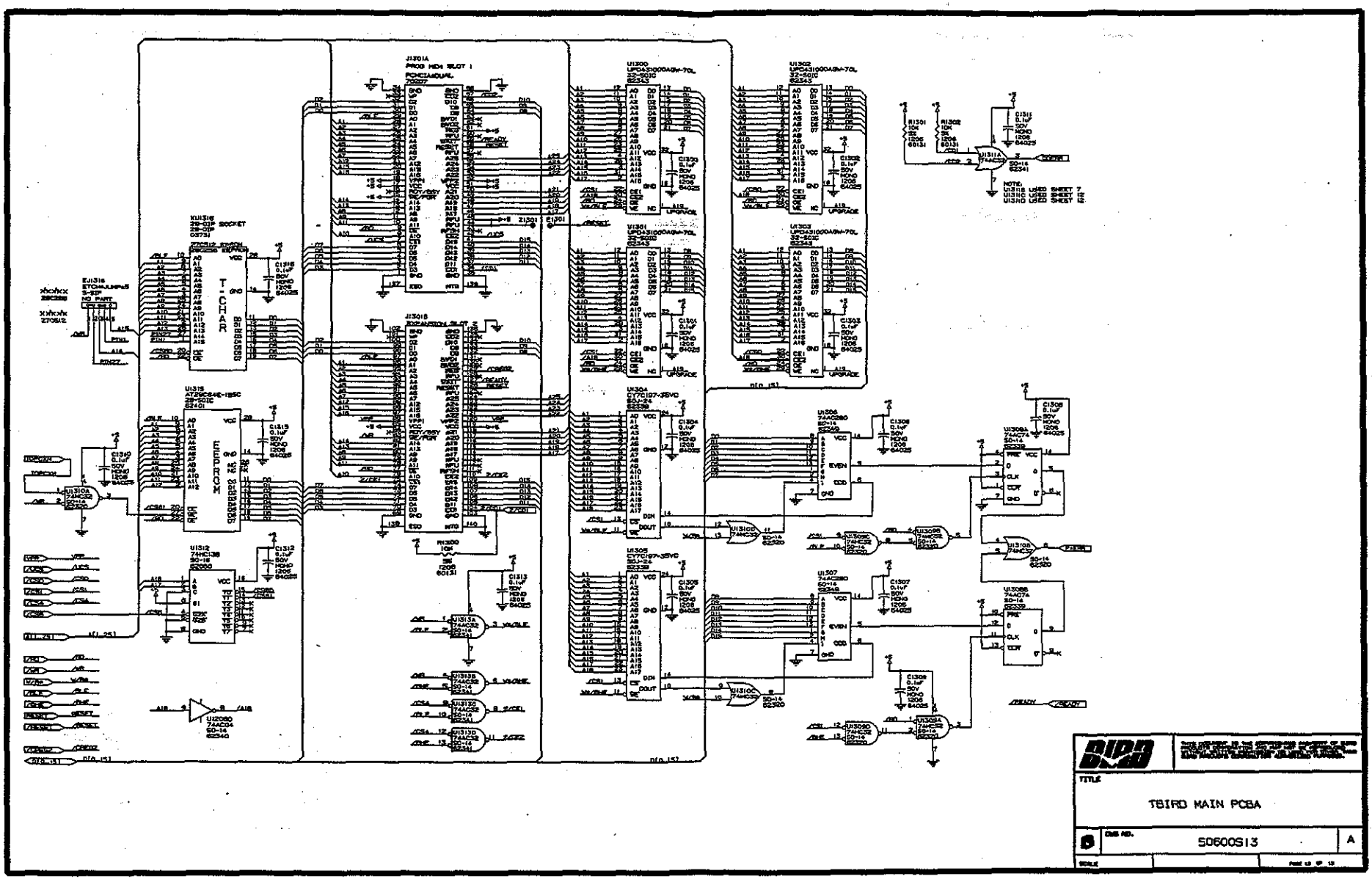
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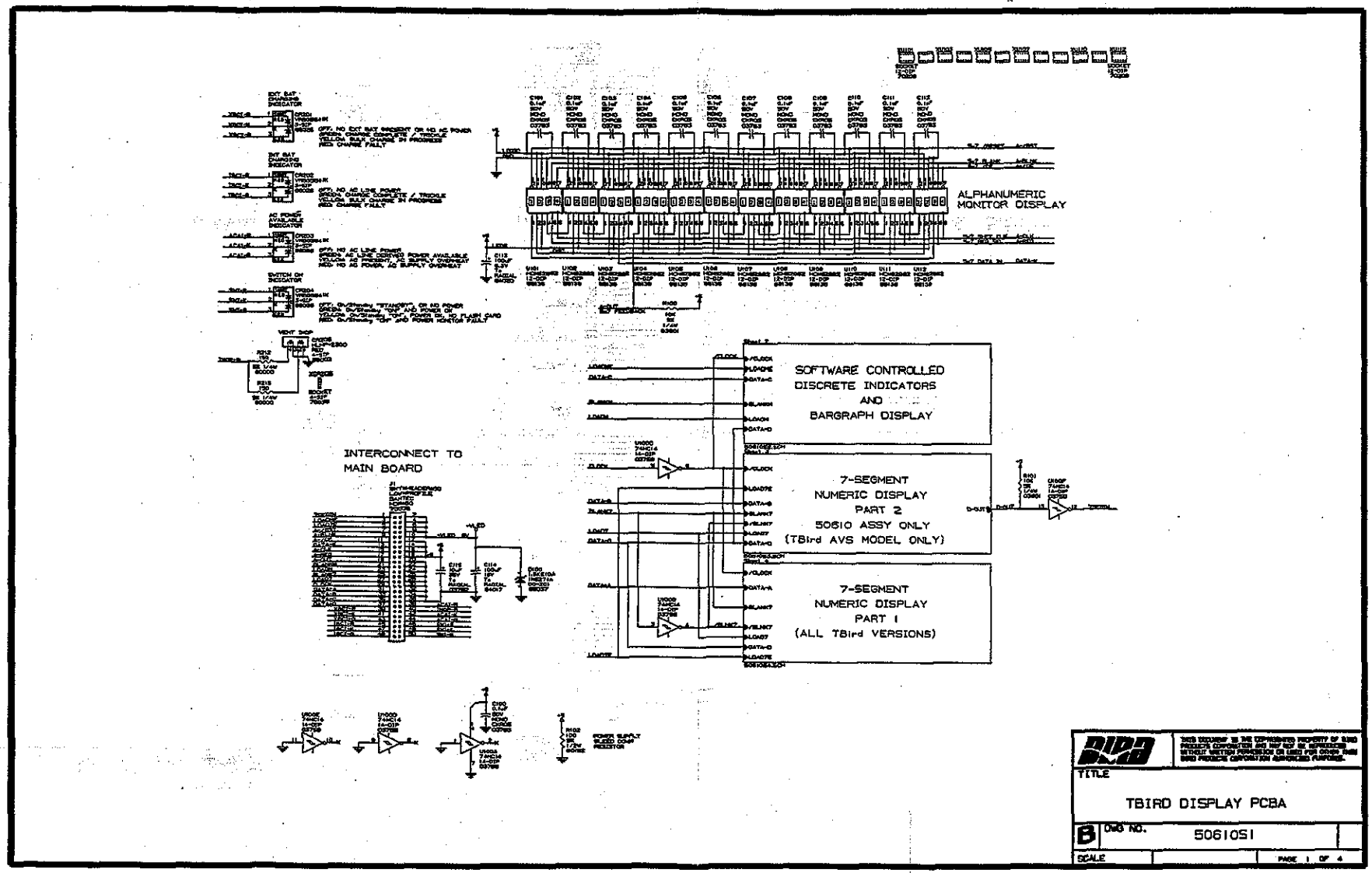
ALPHANUMERIC
MONITOR DISPLAY
SOFTWARE CONTROLLED
DISCRETE INDICATORS
AND
BARGRAPH DISPLAY
7-SEGMENT
NUMERIC DISPLAY
PART 2
50610 ASSY ONLY
(TBird AVS MODEL ONLY)
7-SEGMENT
NUMERIC DISPLAY
PART 1
(ALL TBird VERSIONS)
INTERCONNECT TO
MAIN BOARD
TITLE
TBIRD DISPLAY PCBA
B
DWG NO.
5061051
SCALE
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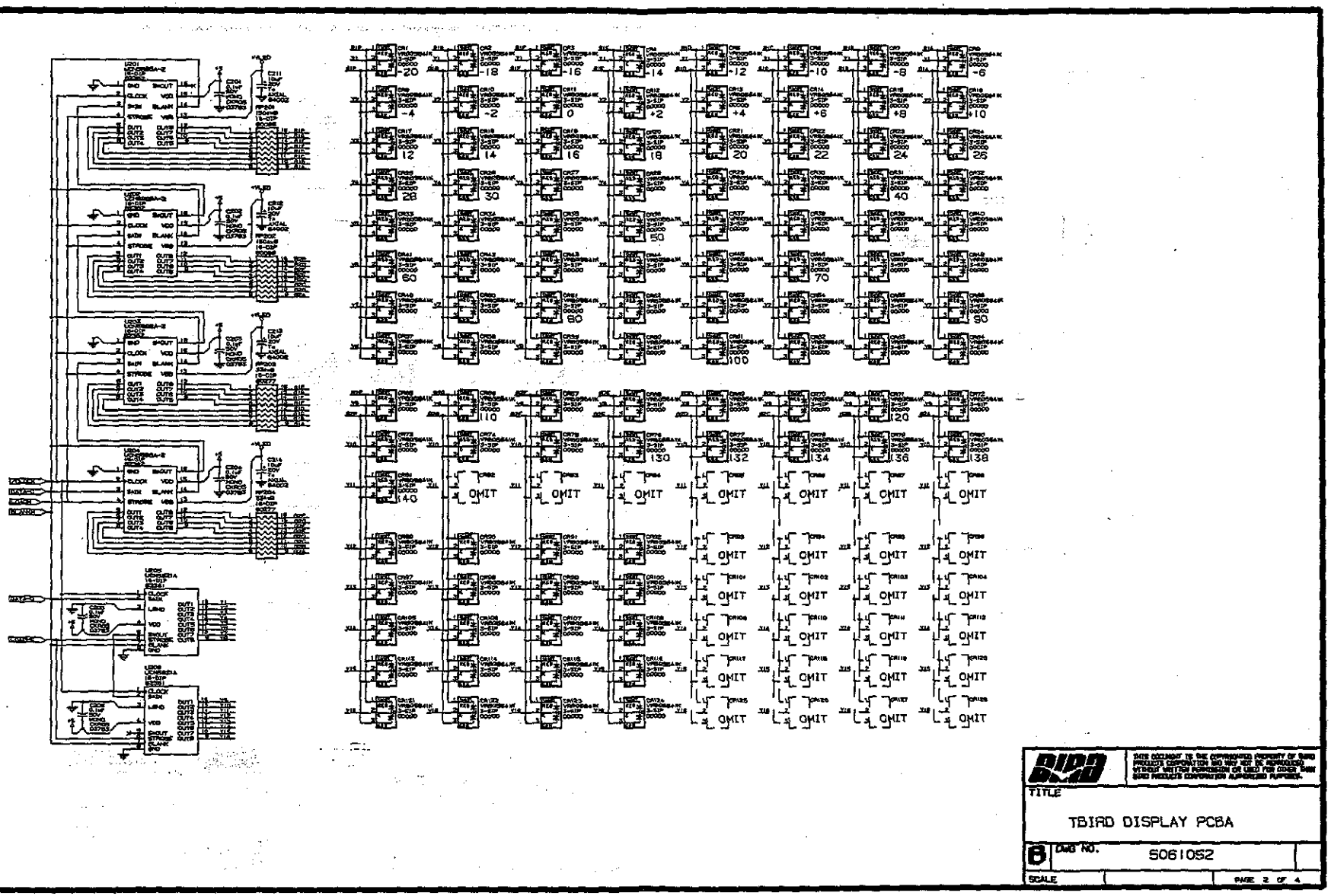
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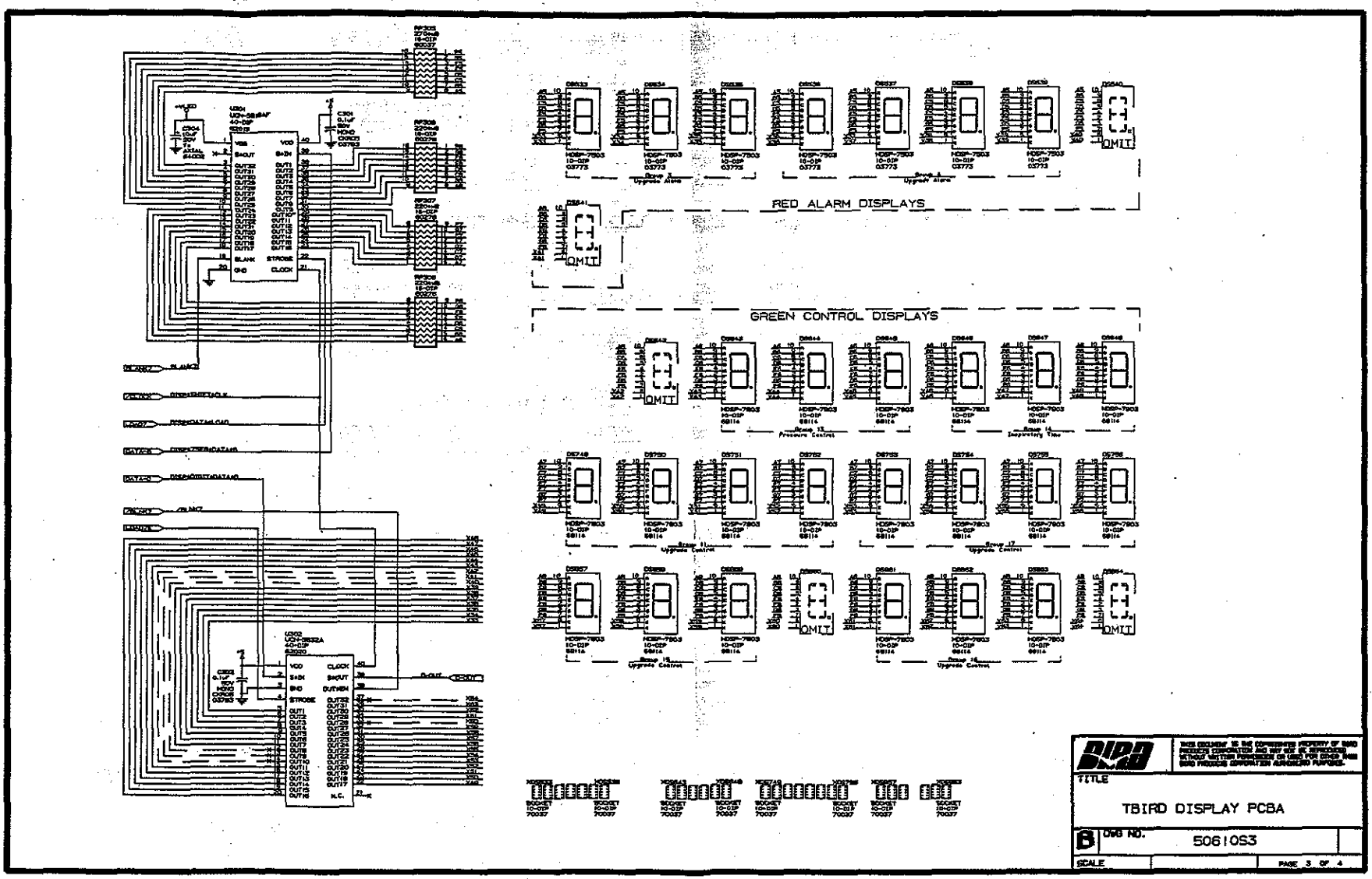
RED ALARM DISPLAYS
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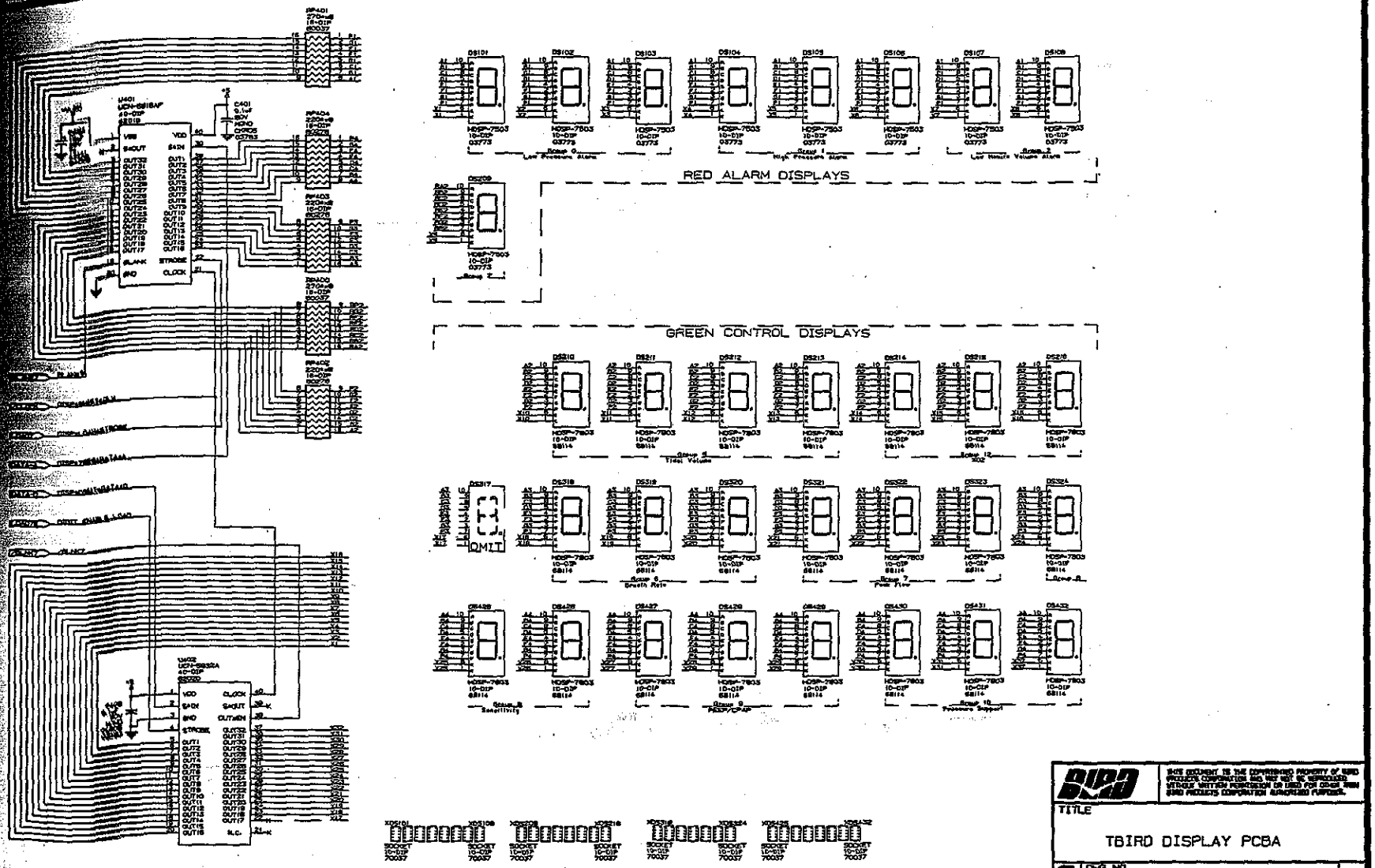
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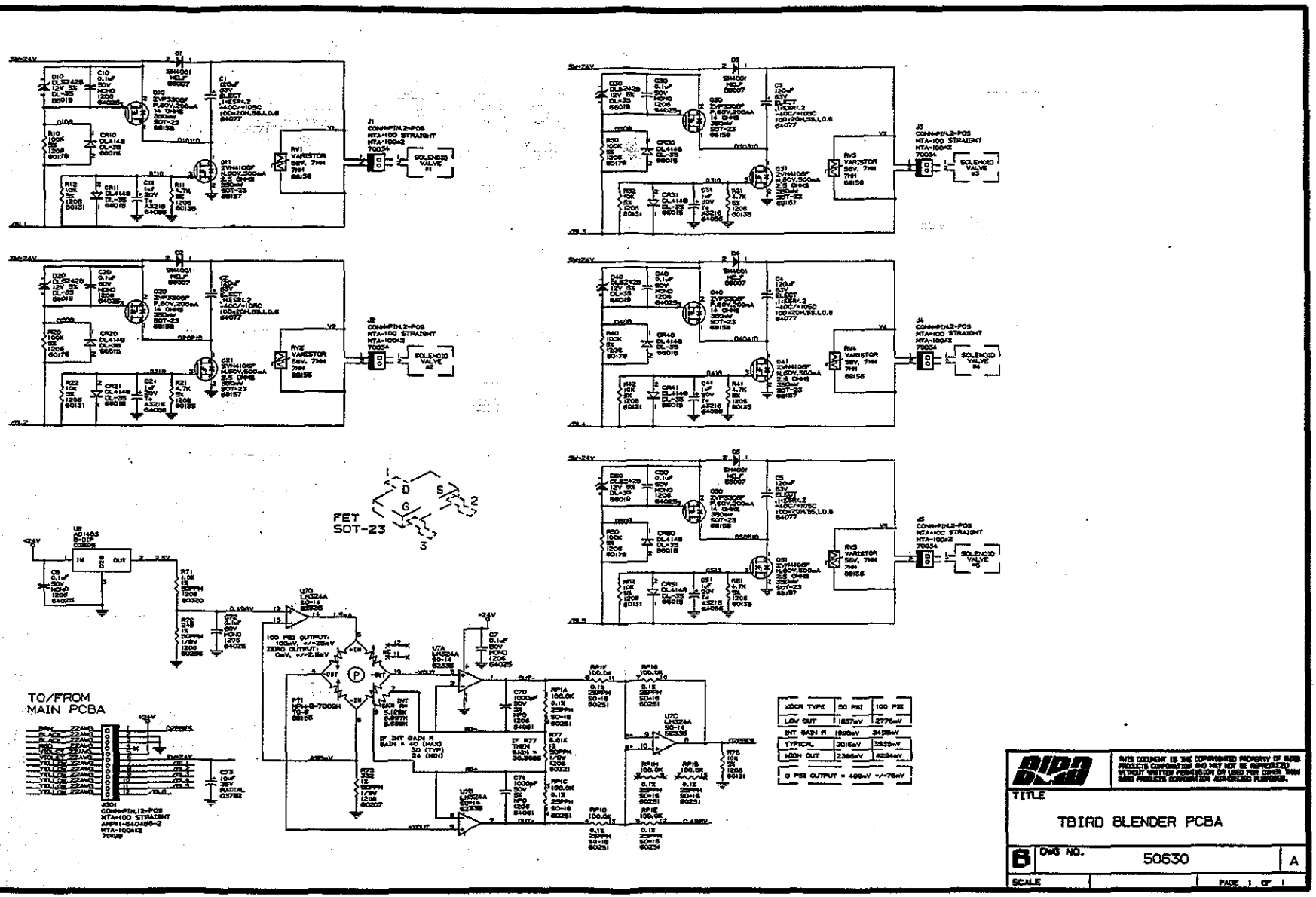
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TBIRD BLENDER PCBA
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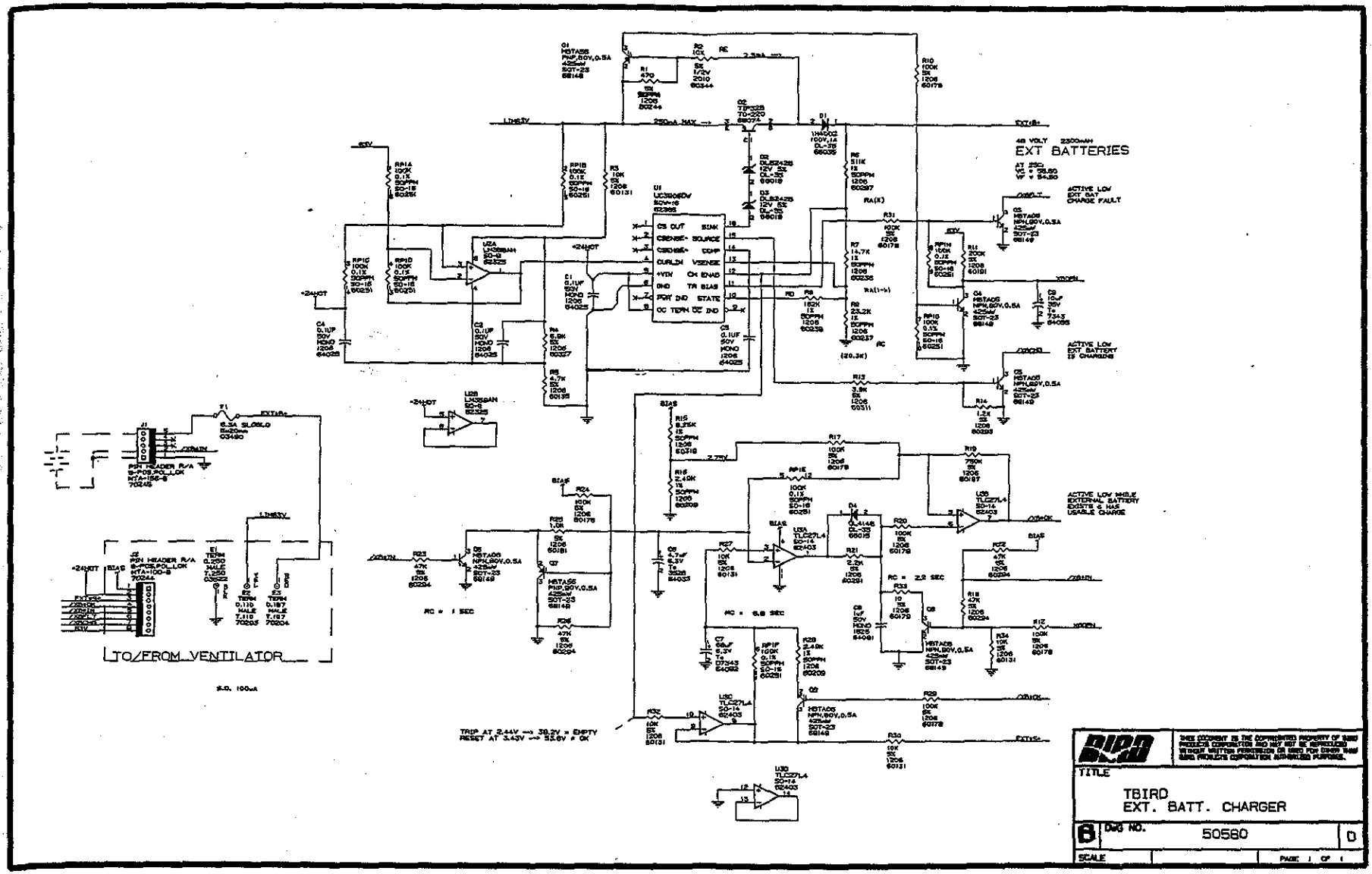
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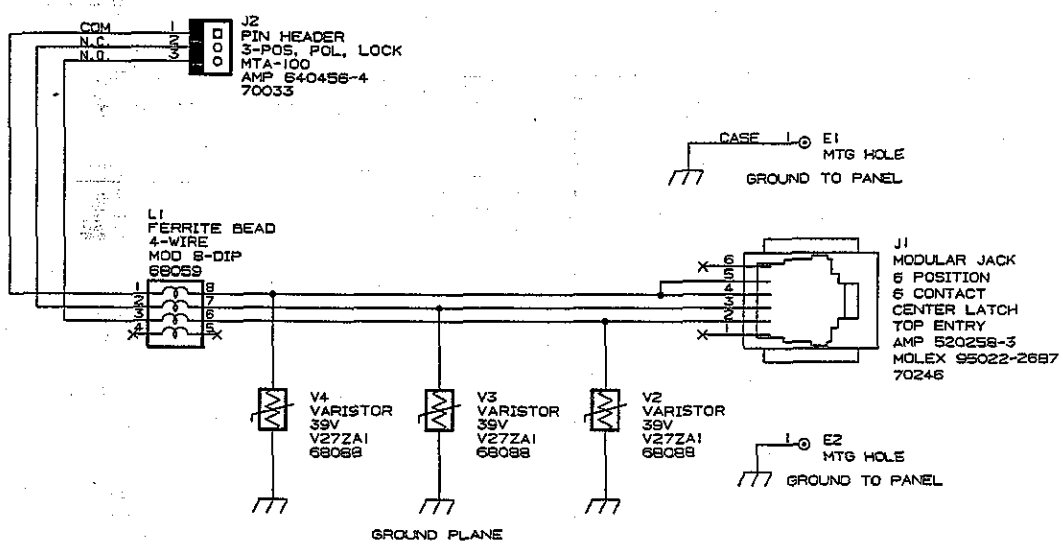
50580



NOTES:

J1 CONTACTS 3-4 NORMALLY OPEN, CLOSE ON ALARM, INOP, OR SHUTDOWN.

J1 CONTACTS 2-5 NORMALLY CLOSED, OPEN ON ALARM, INOP, OR SHUTDOWN.

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TITLE
REMOTE ALARM PCBA

8 DWG NO. 50570

SCALE

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CHAPTER 7 - PARTS LIST

What This Chapter Describes

This section of the TBird V entilator Series Ser vice Manual details the par ts that are available for the repair of the ventilator .

It is intended for the Bird Factor y trained bio-medical technician.

This section is composed in accordance with Bird' s repair policy which excludes the following parts:

1 Any component soldered to PCB' s

2 Component par ts of electromechanical or pneumatic assemblies

If a par t is not specifically included in this section, field repair is limited to the replacement of the next higher assembly containing this part.

Refer to the Removal & Replacement section of this manual for installation instructions.

After replacement of any par t, a thorough check out of the ventilator is mandator y. This will verify that the original problem has been corrected and that no additional problems have been created by the repair process.

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Front Panel Assembly 7-3
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Power Supply PCB Assembly 7-12
Rear Panel Assembly 7-4
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Top Cover Assembly 7-9
Turbine/Muf fler Assembly 7-2
W ire Harnesses and Cable Assemblies 7-10

Turbine/Muffler Assembly

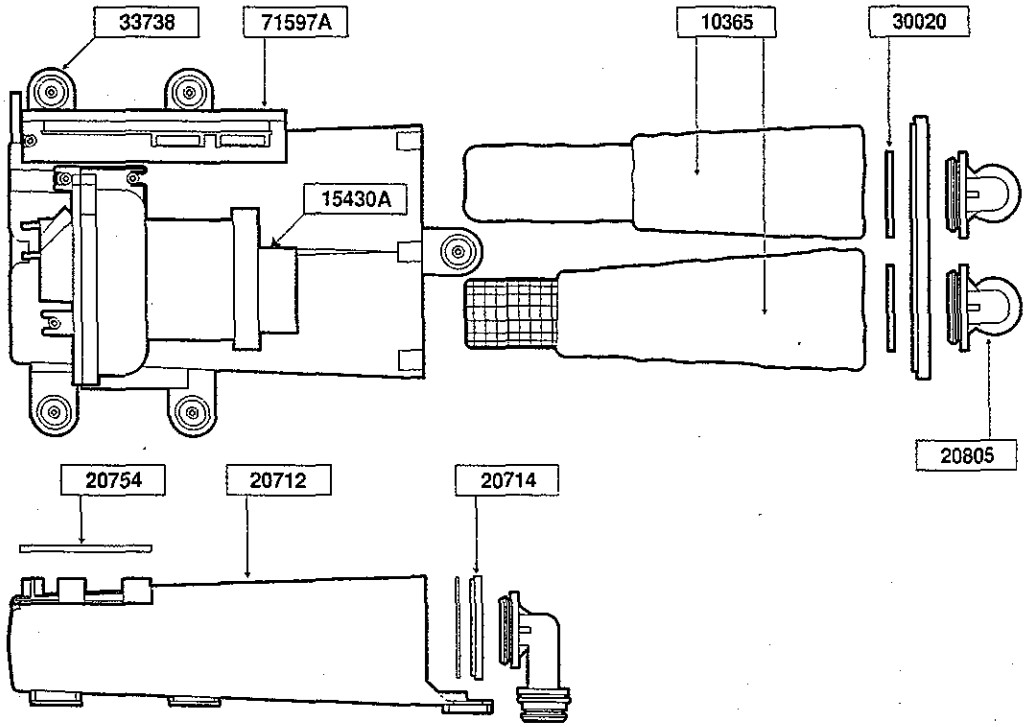

Figure 7-1. Turbine/Muffler Assembly

10365	Muffler/Filter Core Assembly
15430A	Turbine Assembly (Includes T urbine EEPROM and Harness)
20712	Muffler Tube
20714	Muffler Tube Cap
20754	Turbine Base Gasket
20805	90 Degree Elbow
30020	O-Ring
33738	Isolator Grommet
71597A	Motor Driver PCBA

Front Panel Assembly

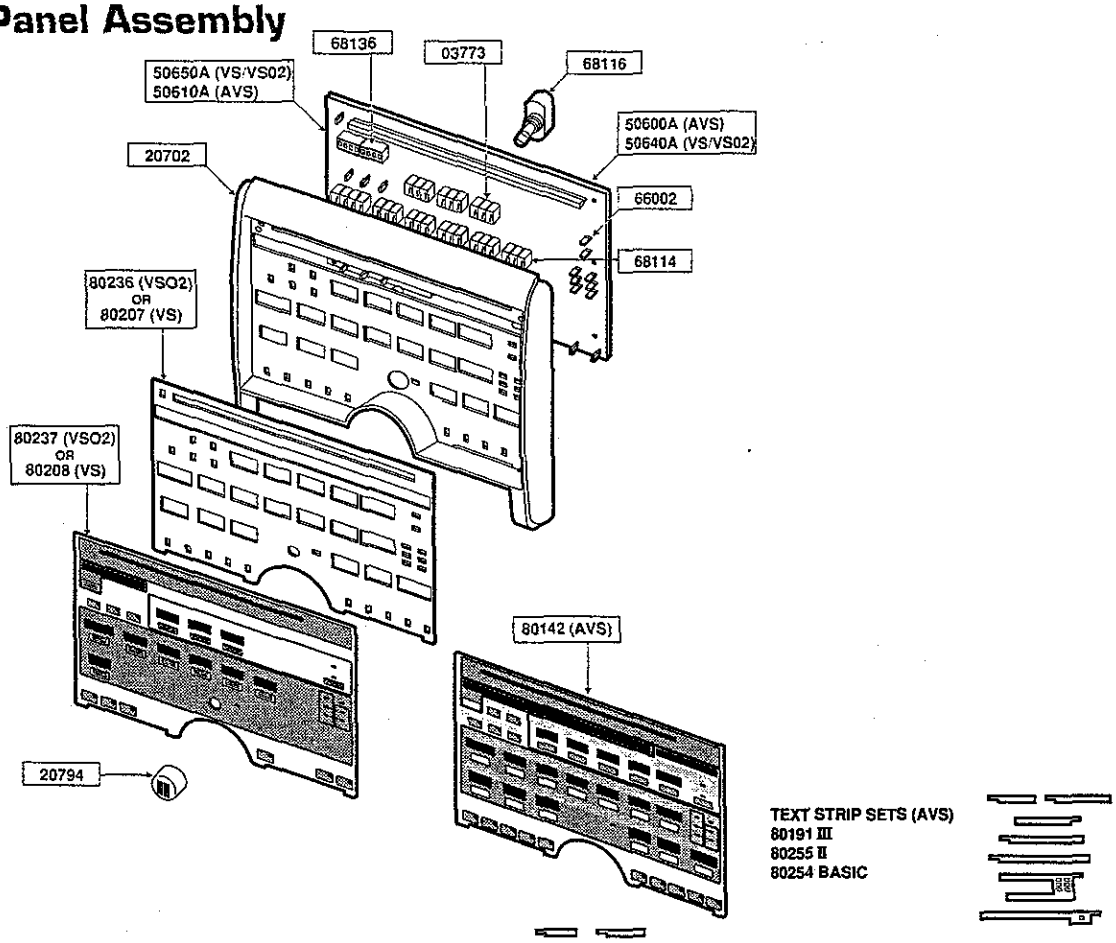

Figure 7-2. Front Panel Assembly

0373	7 Segment Display (Red)	6816	Dot Matrix Display
2702	Front Panel	8142	Control Panel (AVS)
2794	Control Knob	8191	Text Strips (AVS III)
50600A	Main PCBA (AVS)	8217	Control Panel, (TBird™ VS)
50610A	Display PCBA (AVS)	8218	Overlay (TBird™ VS)
50640A	Main PCBA	8226	Control Panel, (TBird™ VSO_2)
50650A	Display PCBA	8227	Overlay (TBird™ VSO_2)
6602	Rectangular Red LED (Vent Inop Only)	8254	Text Strips (AVS Basic)
6814	7 Segment Display (Y ellow)	8225	Text Strips (AVS II)
6816	Optical Encoder		

Rear Panel Assembly

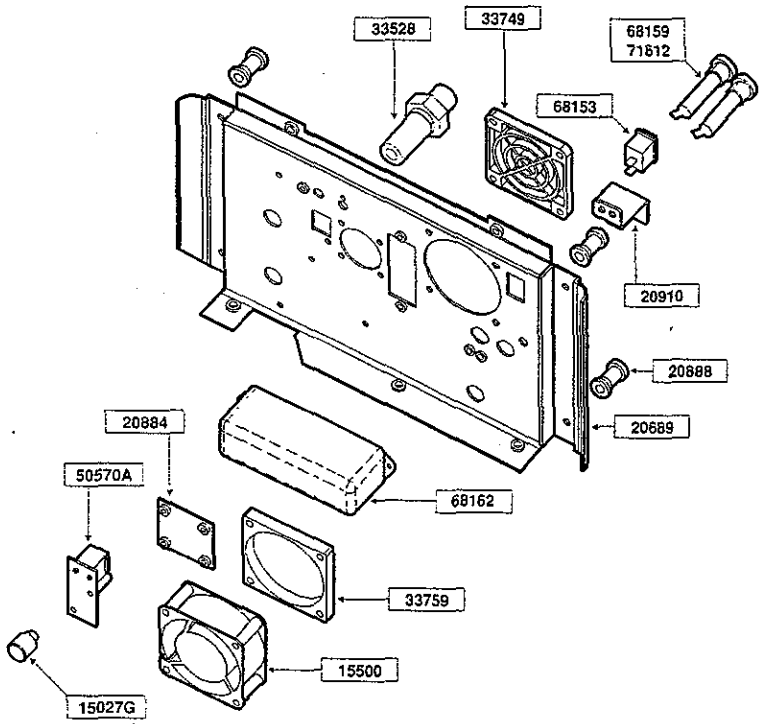

Figure 7-3. Rear Panel Assembly

15027G	Alarm Loudness Control (Includes Cable)
15500	Fan Assembly (Includes Cable)
68162	EMI/RFI Filter
20689	Rear Panel
20884	Cover Plate, Interface
33528	Optical Interface Connector (A VS only)
33749	Fan Air Filter w/ Grill
33759	Fan EMI Filter
50570A	Patient Assist Call PCB
68153	Stand By/On Switch
68159	Fuse Holder (two required)
71612	Fuse, 3.15 A (two required)
20946	Power Cord (Not Shown)
20888	Cord W rap (four required)

Oxygen Blending Components

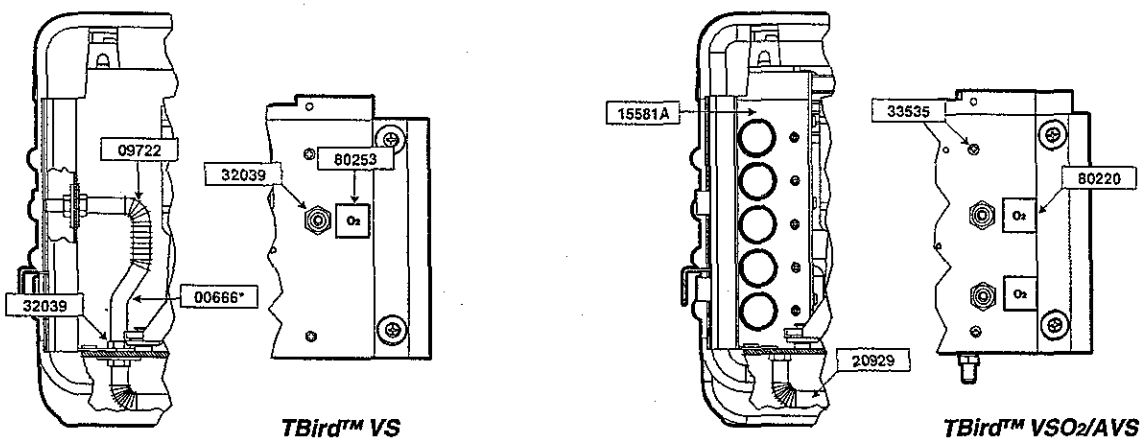

Figure 7-4. Oxygen Blending Components

00666	1/4" ID Green T ubing (50 ft Bulk Only) (**TBird VS**)
09722	Spring
15581A	Blender Assembly
20929	O_2 Bleed T ube
32039	Bulkhead Fitting
33535	Isolation Grommet (**TBird VSO2/AVS**)
37272	Plug (**TBird VS**)
80220	Label (**TBird VSO2/AVS**)
80253	Label (**TBird VS**)

*50 ft. bulk only

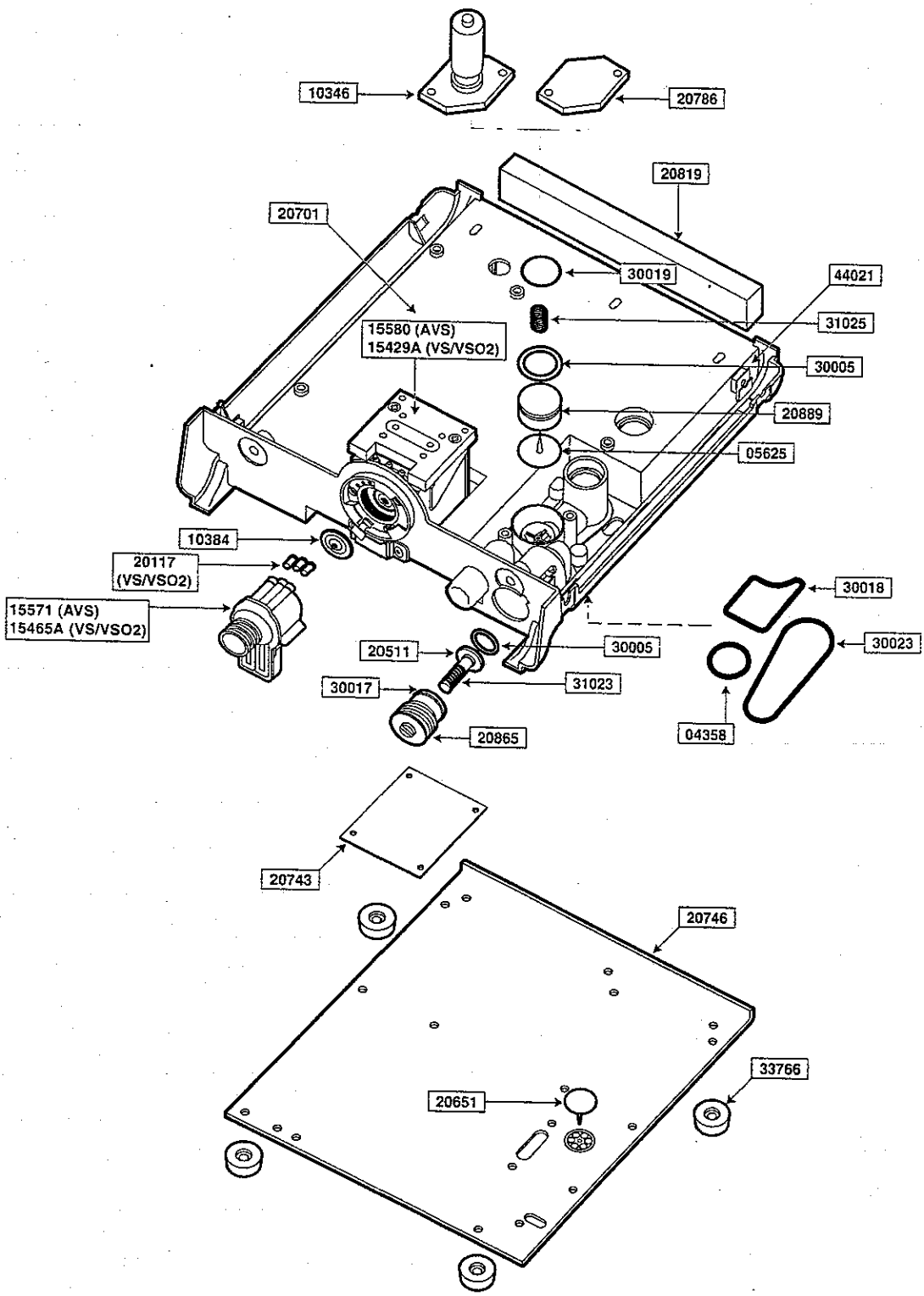

Figure 7-5. Base Assembly

Base Assembly

0458	O-Ring (Baseplate, .737" ID)
10384D	Exhalation Diaphragm/Poppet Assembly (10 pack)
15429A	Exhalation Valve
15465A	Exhalation Body/Flow Sensor Assembly (VS/VSO2)
2017	Barrel Seal
2051	Poppet
2073	Heating Duct Cover
2076	Baseplate
2089	Rear Inlet Filter
2085	Relief Valve Adjuster
3005	O-Ring, (Relief Valve Poppet)
3007	O-Ring, (Relief Valve Adjuster)
3023	Spring
3008	O-Ring (Baseplate, 2.3" ID)
3023	O-Ring (Baseplate, 1.612" ID)
3366	Rubber Bumper
4021	"U" Nut
2001	Base
15580A	Exhalation Valve (AVS)
15571A	Exhalation Body/Flow Sensor Assembly (AVS)
1086	Inspiratory Hold Solenoid
2086	Cover Inspiratory Hold
2051	Valve 13/16" Umbrella
0625	Valve 1.0" Umbrella
2089	Piston Inspirator y Valve
3025	Spring
3009	O-Ring

Right/Left Side Assembly

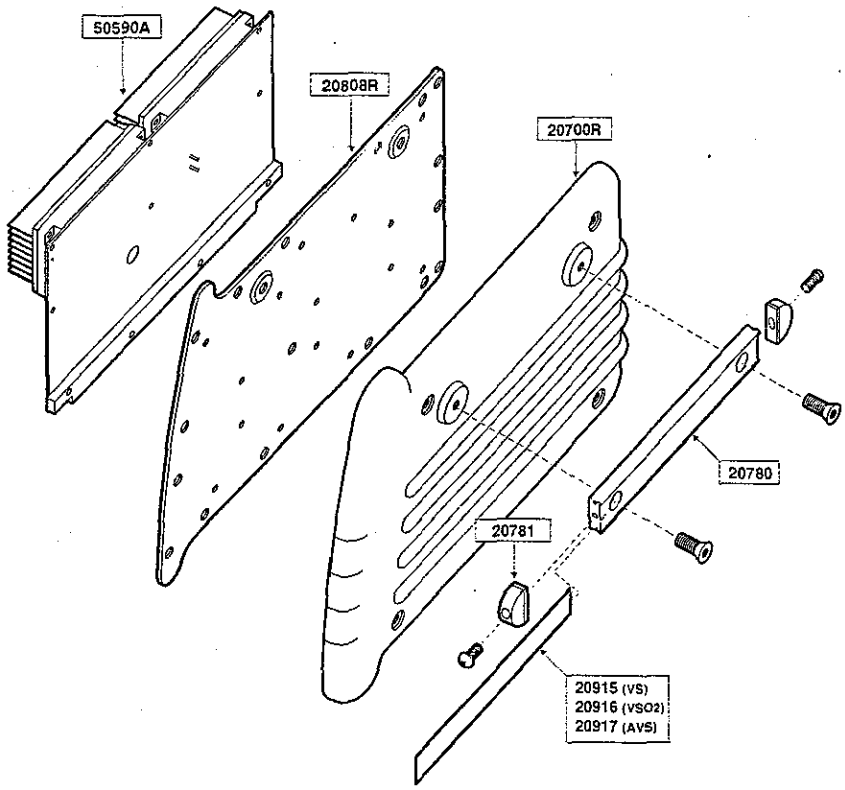

Figure 7-6. Right/Left Side Assembly

20701L	Left Side Panel (Not shown)
20701R	Right Side Panel
20780	Side Rail
20781	Rail End Cap
20808L	Left Side Panel Insert (Not Shown)
20808R	Right Side Panel Insert
20915	Side Rail Insert (VS)
20916	Side Rail Insert (VSO 2)
20917	Side Rail Inser ts (AVS)
50590A	Power Supply PCBA

Top Cover Assembly

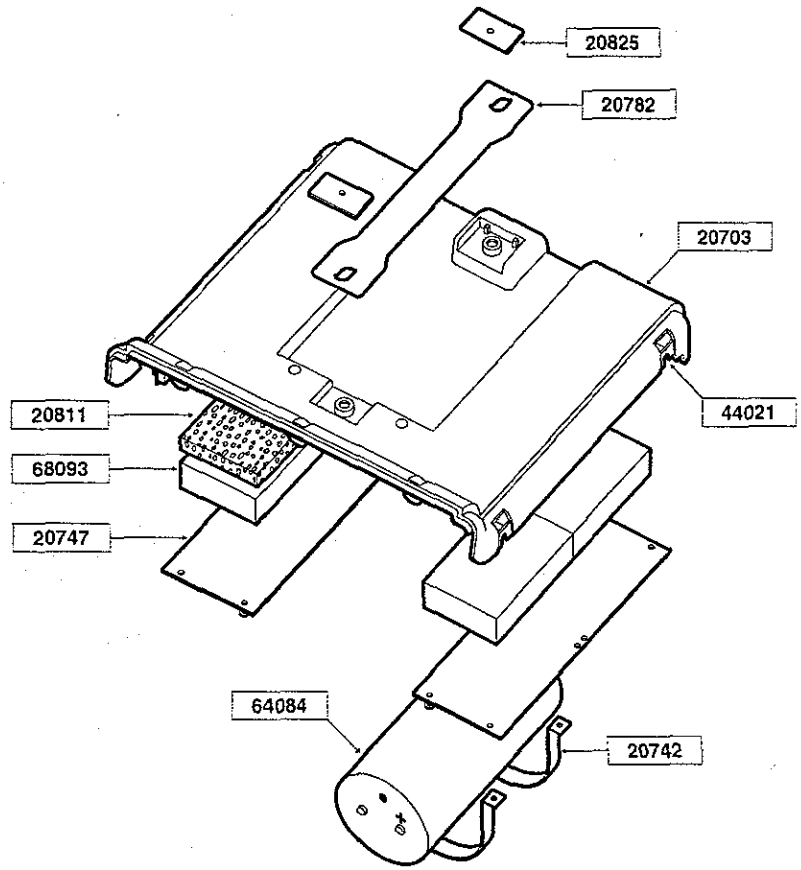

Figure 7-7.Top Cover Assembly

20703	Ventilator Top Cover
20742	Capacitor Bracket
20747	Battery Cover
20782	Handle
20811	Foam Pad
20825	Handle Retainer
44021	"U" Nut
64084	Capacitor
68093	Battery 12Vdc, 3Ah
80228	Label, 12Vdc, .3Ah Battery (Not Shown)

Wire Harness and Cable Assemblies

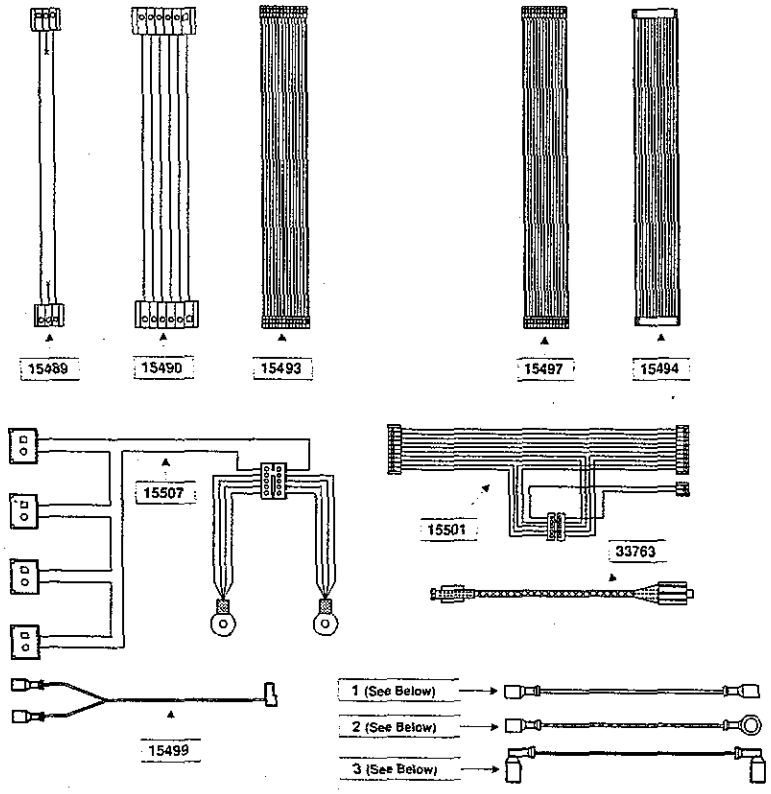

Figure 7-8. Wire Harnesses and Cable Assemblies

15489	Patient Assist Call Cable Assembly
15490	Panel Encoder Cable Assembly
15493	Main/Power I Cable Assembly
15494	Main Power II Cable Assembly
15497	Main/Blender Cable Assembly (VSO 2/AVS Only)
15499	On/Standby Cable
15501	Motor Driver Cable Assembly
15507	Top Cover Cable Assembly
15513	① Cable Assembly , Line Fuse, Black
15514	① Cable Assembly , Neutral Fuse, White
15515	② Cable Assembly , Ground, Power Supply , Green/Y ellow
15512	③ Cable Assembly , Line, Fuse Filter
15513	③ Cable Assembly , Neutral, Line Filter
15514	③ Cable Assembly , Ground, Line Filter
33763	Gas Dryer

Main PCB Assembly

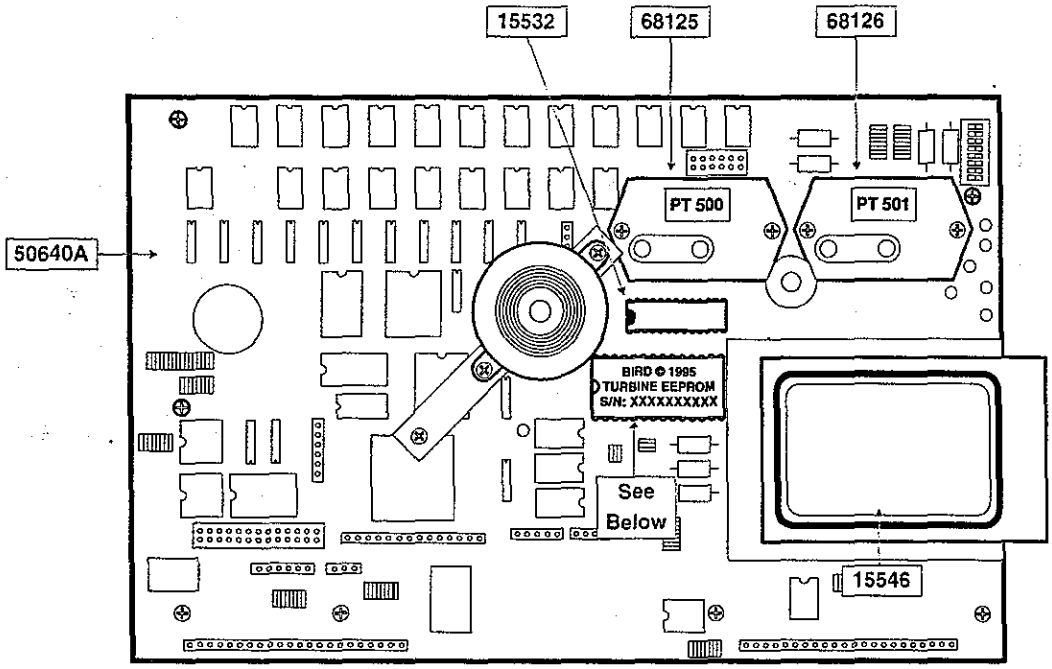

Figure 7-9. Main PCB Assembly

N/A	Turbine Calibration EEPROM(Sold only with Turbine Assy 15430)
15532	Programmed W atch Dog P AL
15546	Program Memor y Card
68125	Turbine Differential Pressure T ransducer
68126	Exhalation Differential Pressure T ransducer
50600A	Main PCBA (AVS)
50640A	Main PCBA (VS / VSO 2)

Power Supply PCB Assembly

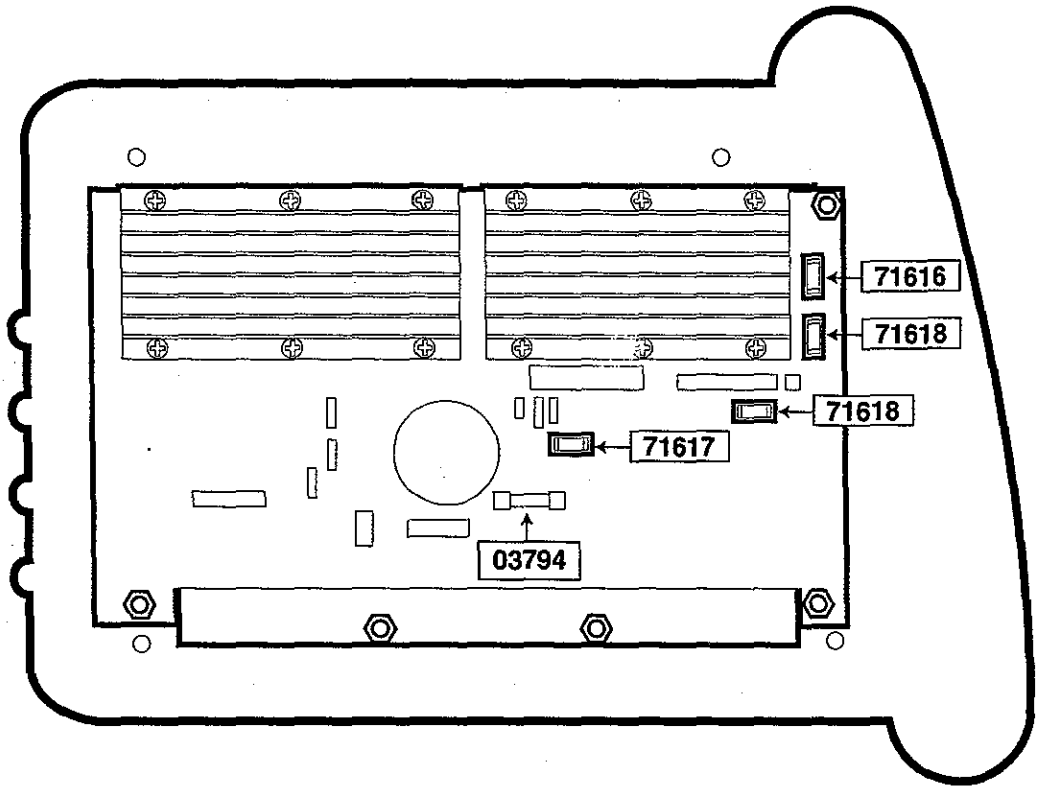

Figure 7-10. Power Supply PCB Assembly

0394	Fuse,F401,5A,SB,5x20mm
5B90A	Power Supply PCBA
7166	Fuse,F402,1A,SB,SMT
7167	Fuse,F603,2.5A,SB,SMT
7168	Fuse,F601&F602,3.5A,SB,SMT

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Thermo Respiratory Group

BIRD®

T Bird® Blender

Repair, Calibration and Verification Instructions

L1465 Rev. A 3/00

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1.0 Warnings, Cautions and Notes

1.1. Terms

WARNINGS identify conditions or practices that could result in serious adverse reactions or potential safety hazards.

CAUTIONS identify conditions or practices that could result in damage to the ventilator or other equipment.

NOTES identify supplemental information to help you better understand how the ventilator works.

1.2 Symbols

This symbol indicates a WARNING

This symbol indicates a CAUTION

This symbol indicates a NOTE

WARNING

The following instructions are for Thermo Respiratory Group Trained Service Technician only: that is a person who has attended a T Bird Service Seminar conducted or authorized by Thermo Respiratory Group Service Training Center.

CAUTIONS

- All printed circuit boards in the T Bird have integrated circuits and can be severely damaged by static electricity. The work must be performed in an electrostatic discharge (E.S.D.) controlled area.
- Unplug power cord from electrical power source, wall outlet, before removing top cover.

2.0 Introduction

This procedure describes how to disassemble, reassemble, calibrate and perform the performance check for the T Bird blender, P/N 15581. This procedure is performed after you have determined there is a problem with the blender.

3.0 Kit Components and Tools Required

The T Bird Blender repair kit comes with the following:

P/N	Description	QTY
10579	6 LPM Valve Assembly	1
15578	Solenoid Assembly	1
L1465	Repair, Calibration & Verification Instructions	1

NOTE

Each step must be followed and completed before moving to the next step.

Tools Required:

- P/N 21621 Solenoid wrench
- 3/16" nut driver
- 1/16" Allen driver
- 5/16" open-end wrench
- 5/16" nut driver
- Phillips Screwdriver
- Anti-Static Wrist strap
- Anti-Static Mat

4.0 Ventilator Disassemble Procedure

4.1 Turn the ventilator power OFF and remove the power cord from the electrical outlet. Remove the ventilator from the stand and place the ventilator on a bench top with antistatic mat.

4.2 Refer to the T Bird Service Manual, P/N L1314, Section 5, Removal and Replacement, for removing the blender assembly from the ventilator.

4.3 Place the blender on an antistatic mat for further disassembly. Set the ventilator aside.

4.4 Locate the solenoid plugged into J1. This is the solenoid for the 6 LPM valve assembly (see Figure 1). Disconnect the Solenoid power cable at J1 on the Blender Circuit Board.

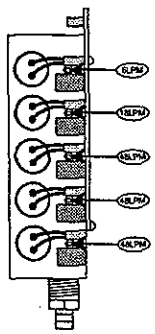

Figure 1
T Bird Blender Circuit Board (Values for reference only)

4.5 Using solenoid wrench, P/N 21621, remove and discard the solenoid from the blender assembly.

4.6 Using a 5/16" Open End Wrench or nut driver, loosen the 6 LPM needle valve assembly. Using a 3/16" nut driver, remove and discard the 6 LPM needle valve assembly from the blender block.

4.7 Inspect the blender block where the needle valve and solenoid were removed from the block. If the block shows signs of dirt, spray alcohol on a cotton tip applicator and clean the block.

4.8 Using a 5/16" nut driver install and secure the new 6 LPM needle valve assembly P/N 10406. Make sure not to over tighten the needle valve.

4.9 Using solenoid wrench, P/N 21621, install and secure the new solenoid assembly, P/N 15578. Connect the solenoid power cable to J1 on the Blender Circuit Board.

4.10 Refer to the T Bird Service Manual, P/N L1314, Section 5; Removal and Replacement, for the installation of the blender assembly into the ventilator.

5.0 T Bird Blender Calibration and Verification

Tools: P/N 01468, 3 way O_2 tee connector
P/N 10293, 6' O_2 hose
3/16" nut driver
1/16" Allen driver
Master Manometer (100 PSI maximum)
50 PSI O_2 source
O_2 analyzer (digital preferred)

6.0 Blender Pressure Transducer Calibration

6.1 Turn T Bird OFF. Remove left side panel. Locate DIP switch 1 on the Main PCB (facing the unit from the rear, it is in the upper right on the Main PCB).

6.2 Turn dipswitch #1 to the ON position (See figure 2). Turn the unit ON. After the power on self-test the monitor window will read SVT ON. Press the Select key. The monitor window will read SOLENOID.

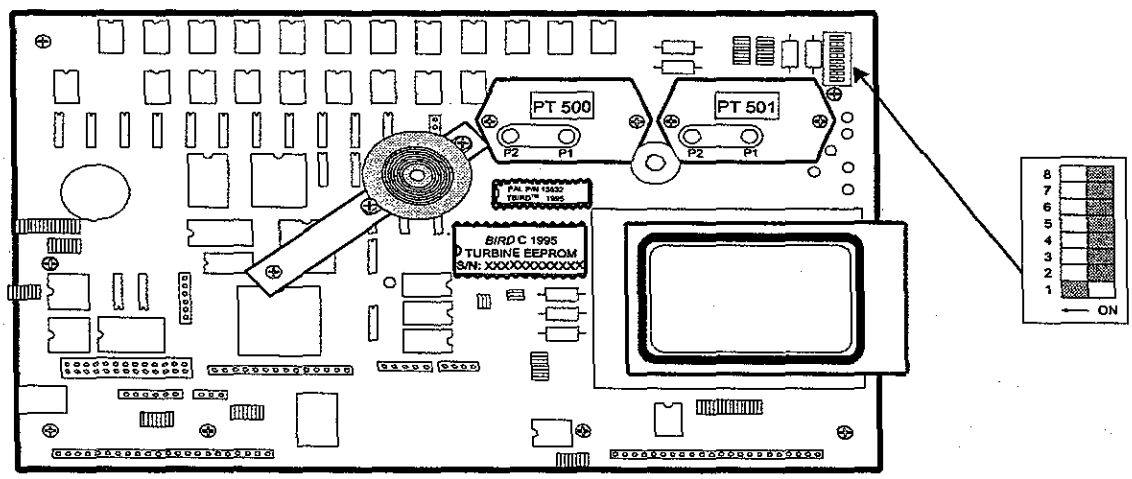

Figure 2
Main Circuit Board

6.3 Press the Select key. The monitor window will read 0 OCC OFF. Turn the SET VALUE Knob until the monitor window reads 8 O_2 OFF. Press the SELECT key. The monitor window will read 8O_2 ON. Press the SET VALUE Knob; the monitor display will read SOLENOID.

6.4 Turn the SET VALUE Knob until the monitor window reads CALIBRATION. Press the SELECT key, the monitor window will read XX.XX. XX is time counting down from 60 seconds.

6.5 Press the Select key, the monitor reads XPRES. Turn the SET VALUE Knob one click counterclockwise, the monitor window will read O_2 PRES.

6.6 With no hose connected to the TBIRD O_2 inlet on the rear of the unit press the SELECT key. The monitor window will read O_2 0.

6.7 Press the SELECT key. The monitor window will read O_2 50. Tee in a master manometer and the 50 PSI O_2 source with the inlet fitting on the rear of the unit (See figure 3).

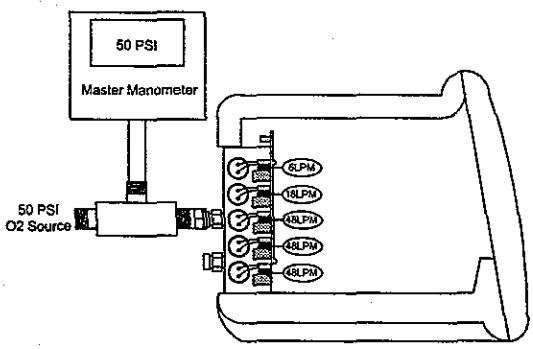

Figure 3
Side View of T Bird Blender (Values are for reference only)

6.8 Turn on the O_2 gas source. Adjust the O_2 source until the master manometer reads 50 ± 1.0 PSI. Once the master manometer reads 50 PSI, press the SELECT key. The monitor window will read O_2 OK. Press the SELECT key again. The monitor window will read XPRES.

6.9 Once the O_2 calibration is complete, you can turn the T Bird off. Locate DIP Switch 1 on the Main PCB and turn to the OFF position (See figure 3).

7.0 Blender FIO_2 Calibration

7.1 Connect a patient circuit and O_2 analyzer as shown in figure 4.

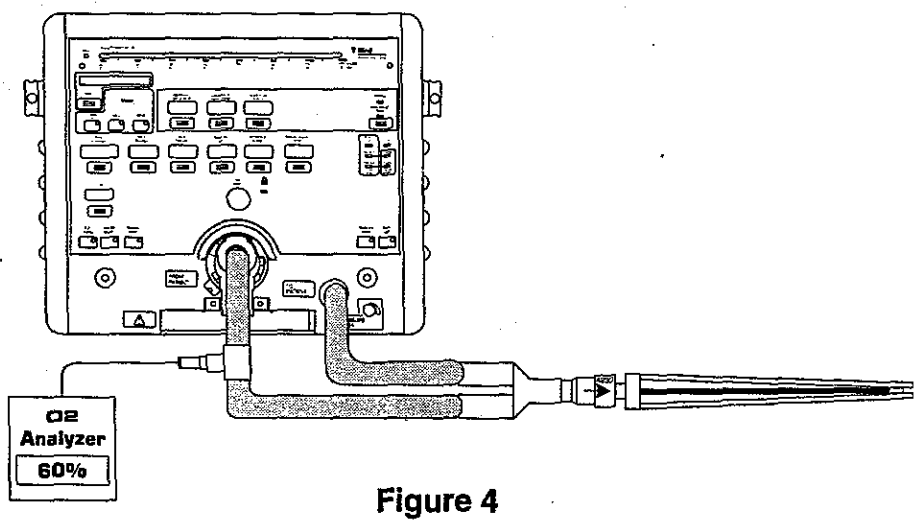

Figure 4
FIO_2 Verification Setup

7.2 Set the control settings as follows:

Mode	Assist Control
Tidal Volume	500 ml
Breath Rate	12 bpm
Peak Flow	60 lpm
Sensitivity	OFF
PEEP/CPAP	0 cmH_2O
Pressure Support	OFF
Low Pressure Alarm	OFF
High Pressure Alarm	90 cmH_2O
Low Minute Volume	0.1L
% O_2	60
Bias Flow	10
Apnea	20 seconds

7.3 Check the O_2 analyzer percentage. It must be 60 ± 5.0% (55 to 65). If out of specification then perform step 7.4. If in specification then go to Blender FIO_2% Verification step 8.0.

7.4 The 6 LPM needle valve will need to be adjusted. That is the first needle valve from the top of the blender. Use a modified 3/16" nut driver loosen the valve seat. To decrease FIO_2, use a 1/16" Allen driver, turn the stem assembly clockwise to decrease the FIO_2 percentage. Adjust the stem with one or two turns on the valve. Let the O_2 analyzer stabilize before making any further adjustment. To increase FIO2, use a 1/16" Allen driver and turn the stem assembly counterclockwise to increase the FIO_2 percentage. Adjust the stem with one or two turns on the valve. Let the O_2 analyzer stabilize before making any further adjustment.

7.5 Once the O_2 analyzer reads 60% ± 1.0% tighten the valve seat. Verify the FIO_2 is still set to 60% ± 1.0% once you have tightened the valve seat. Continue with step 8.0 once the needle valve has been calibrated.

8.0 Blender FIO_2% Verification

8.1 Set the O_2% display to 21% by selecting the O_2 setting and turning the control knob left until 21 is displayed in the window. Allow the O_2 analyzer to stabilize. Reading should be 21% - 24%.

8.2 Set the O_2% display to 30% by selecting the O_2 setting and turning the control knob right until 30 is displayed in the window. Allow the O_2 analyzer to stabilize. Reading should be 27% - 33%.

8.3 Set the O_2% display to 60% by selecting the O_2 setting and turning the control knob right until 60 is displayed in the window. Allow the O_2 analyzer to stabilize. Reading should be 55% - 65%.

8.4 Set the O_2% display to 90% by selecting the O_2 setting and turning the control knob right until 90 is displayed in the window. Allow the O_2 analyzer to stabilize. Reading should be 85% - 95%.

8.5 Set the O_2% display to 100% by selecting the O_2 setting and turning the control knob right until 100 is displayed in the window. Allow the O_2 analyzer to stabilize. Reading should be 95% - 100%.

8.6 Set the O_2% display to 21% by selecting the O_2 setting and turning the control knob left until 21 is displayed in the window. Allow the O_2 analyzer to stabilize. Reading should be 21% - 24%.

8.7 Once the FIO_2% has been verified, from the Operators Manual perform the User Verification Test and the Performance Test (Refer to T Bird Operator's Manual, L1331, AVS Series or L1310, VS/VSO_2 Models, Appendix Section C) before returning the unit to service.

NOTE

For technical questions, call Thermo Respiratory Group at 800/328-4139 or 760/778-7390 or fax at 760/778-7288.

World Headquarters

Thermo Respiratory Group
1100 Bird Center Drive
Palm Springs, CA 92262-8099
U.S.A.

Phone: (760) 778-7200
(800) 328-4139
Fax: (760) 778-7274

European Office

Thermo Respiratory Group
Rembrandtlaan 1b
3723 BG Bilthoven
P.O. Box 299, 3720 AG Bilthoven
The Netherlands

Phone: (31) 30 2289 711
Fax: (31) 30 2286 244